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Master's Thesis

Unemployment in Kazakhstan

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Objectives of thesis

The main goal of this thesis is to objective is data collection and describe unemployment market features in comparison to other countries. Secondary goal to make econometrics analysis and highlight the specifics of the labour market in Kazakhstan.

Methodology

The practical part will consist of a set of data for 20 years from 2001 to 2020. First chapter of the practical part will be used for data collection of unemployment rates within CIS countries and compare it to find mutual correlation, In the second part will make econometrical verification in internal market and try to understand their output.

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Declaration

I declare that I have worked on my master's thesis titled "Unemployment in Kazakhstan" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the master's thesis, I declare that the thesis does not break any copyrights.

In Prague on 31.03.2022

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Unemployment in Kazakhstan

Abstract

This thesis is focused on the labour market in Kazakhstan. The literature review consists of the main characteristics of unemployment and the labour market, as well as a description of the economic situation in Kazakhstan and CIS countries. The policy of unemployment in Kazakhstan will also be mentioned in the literature review. The first section of the practical part of this thesis is to analyse the dynamics of unemployment in comparison with the neighbouring countries of Kazakhstan (Russia, Uzbekistan, Kyrgyzstan, Turkmenistan), which are members of the Commonwealth of Independent States (CIS), in order to understand the composition of unemployment of Kazakhstan and identify the factors that affect the unemployment the most. Data collected over the period 2001-2020 from various sources, such as WorldBank and Ilostat, are described. The analysis shows that Kazakhstan has a stable economy, which is why the unemployment rate shows a consistent decline from 2021. The second part focuses on econometric analysis and evaluation of selected market indicators, such as: Foreign Direct Investment (FDI), inflation, annual GDP growth, urban population growth, time taken to start a business, research and development expenditures, Corruption Perception Index, tourism income and the development of inflation rates for consumer goods and their effect on unemployment rates in Kazakhstan. Using the method of econometric analysis, the dependence of the unemployment rate and selected economic indicators is investigated. According to the results, the combination of the selected independent variables has an impact on the unemployment rate in Kazakhstan, with corruption and Foreign Direct Investment (FDI) having the most significant impact on the change in the unemployment rate in the country.

Keywords: Unemployment, Kazakhstan, labour, policy, economy, wage

Nezaměstnanost v Kazachstánu

Abstrakt

Tato práce se zaměřuje na trh práce v Kazachstánu. Přehled literatury se skládá z hlavních charakteristik nezaměstnanosti a trhu práce a z popisu ekonomické situace v Kazachstánu a v zemích SNS. V přehledu literatury bude rovněž zmíněna politika nezaměstnanosti v Kazachstánu. V první části praktické části této práce je analyzována dynamika nezaměstnanosti ve srovnání se sousedními zeměmi Kazachstánu (Rusko, Uzbekistán, Kyrgyzstán, Turkmenistán), které jsou členy Společenství nezávislých států (SNS), s cílem pochopit složení nezaměstnanosti Kazachstánu a určit faktory, které nezaměstnanost nejvíce ovlivňují. Jsou popsány údaje shromážděné za období 2001-2020 z různých zdrojů, jako jsou WorldBank a Ilostat. Z analýzy vyplývá, že Kazachstán má stabilní ekonomiku, a proto míra nezaměstnanosti od roku 2021 vykazuje trvalý pokles. Druhá část se zaměřuje na ekonometrickou analýzu a hodnocení vybraných tržních ukazatelů, jako např: přímé zahraniční investice (PZI), inflace, meziroční růst HDP, růst městského obyvatelstva, doba potřebná k zahájení podnikání, výdaje na výzkum a vývoj, index vnímání korupce, příjmy z cestovního ruchu a vývoj míry inflace u spotřebního zboží a jejich vliv na míru nezaměstnanosti v Kazachstánu. Metodou ekonometrické analýzy je zkoumána závislost míry nezaměstnanosti a vybraných ekonomických ukazatelů. Podle výsledků má kombinace vybraných nezávislých proměnných vliv na míru nezaměstnanosti v Kazachstánu, přičemž nejvýznamnější vliv na změnu míry nezaměstnanosti v zemi mají korupce a přímé zahraniční investice.

Klíčová slova: Nezaměstnanost, Kazachstán, práce, politika, ekonomika, mzda.

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List of abbreviations

BoP	–	Balance of Payments
CIS	–	Commonwealth of Independent States
COVID-19	–	Coronavirus Disease 2019
FDI	–	Foreign Direct Investment
GDP	–	Gross Domestic Product
i.e.	–	id est (that is)
KZ	–	Kazakhstan
OLS	–	Ordinary Least Square
OLSM	–	Ordinary Least Square Method
p.a.	–	Per annum
PPP	–	Purchasing Power Parity
USD	–	United States Dollar
USSR	–	Union of Soviet Socialist Republic

1 Introduction

The labour market is one of the crucial marketplaces in determining a country's economic stability. Therefore, any government strives to identify efficient ways to develop the labour market and reduce unemployment. It is undeniable that any economic policy to lower unemployment must either increase employment or decrease layoffs. As a result, the government alters the country's natural unemployment rate. Unemployment refers to the lack of employment opportunities for non-disabled people in the national economy. The non-disabled are those who can work in the national economy due to their age and state of health (Tetsuo, 2018). Providing good work is the foundation for population social security, the most critical condition for the growth and realization of human resource potential, and the primary means of growing social wealth and improving quality of life.

One of the most severe issues confronting any country transitioning to a market economy is the possibility of mass unemployment. Today, initiatives aimed at preventing the collapse of the labour market and mitigating its social implications have taken on new importance. First and foremost, something should be stated about the nature of the crisis that is causing unemployment in our circumstances. Crisis generating unemployment in our context is not a cyclical crisis, as is common in established capitalism's economy, which "by itself" leads to a recovery phase with only frictional and minimal structural unemployment after a while. A transformational economic crisis is the cause of mass unemployment. It is not cyclical but mostly structural and reflects the inherent tensions of the conditions from a command to a market economy transition (Pettinger, 2016). As a result, the only path out of the crisis is for the national economy to undergo significant structural adjustments. However, in the area of employment, the government's regulatory role must be maintained.

This thesis aims to investigate unemployment in Kazakhstan. According to officials, Kazakhstan's unemployment rate is 4.8%, with a little more than 442,000 jobless individuals. However, according to experts, official data are understated, and many more people are without stable employment (Radio Azattyq, 2019). One of the problems with Kazakhstan's high unemployment rate is the population's attitude and inappropriateness to life in a modern market economy after living in a communist system. The country's industrial production is declining, which is a serious concern. In addition, high taxes and

administrative fees compel private businesses to decrease labour expenses, raising the unemployment rate. As can be seen, there are various issues with Kazakhstan's labour market which makes research on this topic relevant. Conducting a study in this area is critical because it may serve as the foundation for providing recommendations to improve the situation.

In order to be able to elaborate on Kazakhstan's labour market, it is necessary to approach the topic with its theoretical background. Therefore, after the description of the objectives of the work and the methodological approach in the following chapter, a theoretical classification of unemployment and the labour market is given in chapter 3. Once the basics have been described and explained, the practical part will be carried out in chapter 4. This consists of two parts. On the one hand, Kazakhstan is compared with other selected CIS countries in terms of GDP, sectoral employment, unemployment trends and minimum wage. On the other hand, an econometric model is then conducted to identify the specific factors that significantly influence unemployment in Kazakhstan. Chapter 5 presents and discusses the results of the two sections of the practical part of the study, followed in Chapter 6 by possible recommendations for further stabilizing Kazakhstan's labour market and economy.

2 Objectives and Methodology

2.1 Objectives

The main objective of this thesis is to understand the composition of unemployment of Kazakhstan and identify the factors that affect the unemployment the most. In order to understand this, data on Kazakhstan and neighbouring countries of Commonwealth of Independent States (CIS), such as Russia, Kyrgyzstan, Uzbekistan, and Turkmenistan for the years 2021-2020, will be collected if available and compared in terms of GDP growth, share of employment in the three sectors agriculture, industry, and services and unemployment rates to analyse general trends and differences. The second objective is to identify the factors that influence Kazakhstan's development of unemployment the most in order to draw conclusions on possible recommendations for actions by conducting an econometric analysis. The basis for the econometric model is formed by the following hypotheses:

- H0. There are no statistically significant factors within this model.
- H1. Changes of unemployment rate in Kazakhstan are mainly explained by the 9 independent variables which were considered in the model.
- H2. Development of inflation rates for consumer goods and income from tourism are the most important factors influencing changes on unemployment rate.
- H3. Increase on Foreign Direct Investment (FDI) within Kazakhstan has a positive effect on decrease of unemployment.
- H4. Corruption perception index is playing an important role on the unemployment rate. So, increase of corruption perception should lead to an increase of unemployment as well.

2.2 Methodology

The thesis will consist of two main parts. The first part will be a general knowledge of unemployment and the labour market, as well as all the economic theories that are necessary for this study. The practical part will consist of a set of data for 20 years from 2001 to 2020¹. The first chapter of the practical part is to analyse the dynamics of

¹ 2001 – 2020 depending on the availability of the data.

unemployment compared to the neighbouring countries of Kazakhstan which are members of the Commonwealth of Independent States (CIS), in order to understand the composition of unemployment of Kazakhstan and identify the factors that affect the unemployment the most. A comparison with the selected countries is particularly useful for two reasons. First, all of them faced the challenge of transforming from central planning to a market economy in 1991. Secondly, they are also geographically close to each other, which means, for example, that they have comparable climatic conditions. For this purpose, data on GDP growth, GDP per capita, the distribution of employment in the three sectors, minimum wage and unemployment will be used and compared among the selected CIS states.

The second part consists of an econometrics analysis and evaluation of the selected market indicators influencing unemployment rates in Kazakhstan. Based on the predetermined hypotheses, it is assumed that Kazakhstan's labour market changes are described dependent on the changes if 10 independent factors will be analysed. Using the econometrics analysis method, the dependence of the unemployment rate in industry on the selected economic indicators such as foreign direct investment, inflation, annual GDP growth, urban population growth, time required to start a business, research and development expenditure, income from tourism (in million USD) and development of inflation rates for consumer goods are tested. With the analysis, it will be concluded whether all factors considered for unemployment rates will have significant impact or not. The following statistical verification methods will be used for verification and validation of the proposed hypotheses:

- Statistical verification with T-Test to find significant factors
- Multicollinearity with usage of Correlation analysis
- Elasticity to understand the exact percentage impact on unemployment rate

3 Literature Review

In this section, the theoretical foundations of the thesis are presented, which includes a definition of the labour market and unemployment terminologies, types of unemployment

and their impact on the economy and society. Also, the main types of labour will be discussed. Furthermore, the problem of Kazakhstan's employment policy as well as the ones of the CIS countries will be described.

3.1 Unemployment

Due to cyclical variations in the economy and inefficient use of labour resources, unemployment has grown in recent years, the employment crisis has been significant, and as a result, concerns of poverty reduction have become more prominent. One of the essential issues of managing market economy policy is the issue of unemployment.

The importance of the work stems from many people's precarious economic situations and the necessity to develop effective strategies for using labour resources. Unemployment has a few social repercussions, including a slowing of economic growth, deprivation of livelihoods, and a loss of able-bodied population qualification (Raizberg, 2022). That is why state-level employment regulation is so critical. Despite the vast number of publications on this topic, economists continue to research unemployment to discover its causes and enhance future employment policy orientations. The economy of an agrarian community was a largely steady and varied little year to year. Unemployment was far less of a concern before the industrial revolution than now. It was undoubtedly present, but there was no widespread unemployment (Zhukov, 2018).

Currently, unemployment is one of the critical elements of the modern economy. It is measured by the unemployment rate for a particular age group by dividing the number of employed persons in that age group by the total number of people in that age group which can also be seen in the formula 1 below (OECD, 2021). Many people are looking for work, but not the entire population should be considered unemployed. The unemployed people are not all people living in a country, but those in the labour force, that is, those who have no conditions not to work.

Formula 1: Unemployment Rate

$$\text{Unemployment Rate} = \frac{\text{Number of Unemployed}}{\text{Labor Force}} \times 100.$$

Classical political economics (which include A. Smith, D. Ricardo, J. Mill, and A. Marshall) see the market as a self-regulating system in which involuntary unemployment has no place; they believe that the source of unemployment are excessively high wages, which result in a labour supply surplus (Gloveli, n.d). J. M. Keynes, an English economist, made the most significant contribution to the study of employment theory. In a mature market economy, Keynes noticed that as the national economy expands, most people save some of their income. However, a certain amount of consumer demand is required to convert them into investment. When consumer demand falls, people lose interest in spending capital, and investment growth fall as a result. As a result of these dynamics, unemployment rises (Jahan, 2014).

Many economists argue that the following factors contribute to unemployment: stringent labour regulations, high labour expenses, minimum pay, and a mismatch between worker professional and qualification mix and labour demand. Other factors that contribute to unemployment in today's economy include economic downturns and depressions which force businesses to cut labour demand as well as new technologies, structural transformations in the economy, population growth, and insecurity in developing sectors of the economy (Shevchenko, 2017). All these interrelated factors contribute to the growth of unemployment in one way or another. This process's uncontrolled progression can have catastrophic macroeconomic effects. According to modern economics, total employment is unachievable, but a well-functioning market economy can assure full employment (Raizberg, 2022).

Natural unemployment occurs when the number of persons seeking work equals the number of available jobs in a market economy, resulting in a scenario near to full employment. However, it is vital to remember that full employment does not indicate that there will be no unemployment but rather that there will be a minimal amount of unemployment (Hall, 1979).

The labour force is expressed as the amount of employed and unemployed individuals, and the unemployment rate is characterized as the measure of the labour force that is not working. This is further visualized in Formula 2.

Formula 2: Labour Force

$$\text{Labor Force} = \text{Number of Employed} + \text{Number of Unemployed},$$

3.1.1 Types of unemployment

Unemployment, or the periodic unemployment of economically productive people, is a vital component of a market economy. The causes of this occurrence are several. First, there are the economic structural shifts, in that the adoption of new technology and equipment reduces the number of redundant workers. Second, an economic downturn or depression forces businesses to cut back on all resources, including employees. Third, government pay policies: as the standard labour market model shows, boosting the minimum wage raises the cost of manufacturing and consequently reduces labour demand. Adjustments in the seasonal output level in some areas of the economy are the fourth factor to consider. Fifth, changes in population demographic structure, particularly an increase in the working-age population, result in higher labour demand and, as a result, an increase in the likelihood of unemployment. (Welfens, 1999). To formulate the primary forms of unemployment based on the factors above. Frictional unemployment is linked to people moving from one job to another and from one location to another. Since both people and jobs are heterogeneous, this type of unemployment necessitates a certain amount of time for "mutual search" (Goodwin, 2019).

Structural unemployment is associated with technological advancements, and the market for products and services is constantly changing new goods emerge to replace those that are no longer in demand. In this context, businesses rethink their resource structures, particularly labour resources. In most cases, the implementation of new technologies results in the firing of specific employees or the retraining of others (Pasinetti, 1990).

Seasonal unemployment relates to unequal volumes of production executed by some industries over different periods, i.e., in some months, demand for labour in these industries increases (and, as a result, unemployment decreases), while in other months, demand for labour in these industries decreases (and, as a result, unemployment increases) (and

unemployment increases) (White, 1941). For example, agriculture and construction are two industries marked by seasonal swings in production (and thus employment). Cyclical unemployment is affected by a lack of aggregate demand for products and services, causing unemployment to rise in the industries that produce these things (Shimer, 2005).

The domestic economy's hidden unemployment is a common occurrence. It's essential is that when an enterprise's resources are underutilized as a result of the economic crisis, workers are not fired; instead, they are transferred to decreased working hours (part-time working week or working day) or forced unpaid leave. Even though such workers are not technically unemployed, they are unemployed (Malmberg-Heimonen, 2002).

3.1.1.1 Frictional unemployment

Frictional unemployment is a common occurrence throughout the job-hunting process. When people quit their previous job but have not yet found a new one, it can be referred to as frictional unemployment. Here, workers usually leave of their own will, for example when they need to relocate or have saved enough money to search for a more suitable position. Frictional unemployment also arises when students search for their first job or when mothers return to their old position or try to find a new one after maternity leave. Fewer times, it can also be referred to when employees are laid off for no apparent cause or, in rare situations, for reasons such as a company's insolvency (Mankiw, 2006). However, frictional unemployment benefits the economy because it permits employees to migrate to better positions in which they work with higher productivity (Goodwin, 2019).

3.1.1.2 Structural unemployment

Structural unemployment arises when the economy transforms, resulting in a mismatch between employees' talents and the skills employers require (Lindbeck, 2015). One example for this could be the replacement of machine employees by robots. Workers must now learn how to operate the robots that have taken their jobs. Those who have not learned must retrain for new occupations or suffer structural unemployment for the long run.

When a downturn lasts for an extended period, structural unemployment is common. Workers' skills are likely to be obsolete if they have been out of employment for an extended period. They may stay unemployed even when the economy improves if they are reluctant

or unable to take lower-level unskilled work. In this situation, structural unemployment causes natural unemployment to rise (Lindbeck, 2015).

3.1.1.3 Cyclical unemployment

During a depression, industrial crisis, or recession, cyclical unemployment is related to a decline in labour demand in all industries and areas. During periods of increased output, the minimal value of this phenomenon is seen. In cyclical unemployment, the utilization of production capacity is insufficient, resulting in a decrease in industrial production, leading to jobless stagnation (Shimer, 2005).

3.1.1.4 Seasonal unemployment

Another sort of unemployment is seasonal unemployment. This type of unemployment is expected in the tourist, construction, and agricultural industries. Seasonal unemployment differs from all other forms of unemployment in that it may be foreseen. Resort employees, ski instructors, and ice cream vendors are seasonally unemployed as well. Construction workers are laid off in most country regions throughout the winter. School employees might also be classified as seasonal employees. As the name indicates, seasonal unemployment comes as a result of seasonal variations (Barsky & Miron, 1989).

3.1.1.5 Hidden unemployment

Workers that are on the part time on unpaid leave, who are formally on the payroll, but not getting paid this is called hidden unemployment. There are many causes of hidden unemployment:

- transition country of one economic system to another
- the market mechanism in the current stage
- a lot of transformational processes of the society

The biggest issue with employment is inefficient utilization of the hired work force, most notably being in forced downtime. Another issue of hidden unemployment is replication of the employer's professional and qualification structure: the degree of professional training of employees in mass professions does not match to future requirements. Because most job openings in the labour market are in engineering and blue-collar jobs, many businesses are beginning to collaborate with universities and employ the services of training centres to

address the scarcity of professionals in these fields. Remote work is also getting more common, which helps firms recruit competent individuals from various parts of the country (Kaufman, 2017).

To eradicate hidden unemployment and maintain an aggressive employment strategy, the following requirements must be met:

- collaboration of employers, the state, and educational organizations
- flexible professional training, retraining, and education in accordance with economic requirements
- a mechanism for adapting and preserving human resource labour potential to the renewing structure of jobs and the modern hiring system
- development of additional market-regulatory measures
- The labour market's unemployment rate is closely related to the rate of economic development and the stage of the economic cycle. During the economic crisis, hidden unemployment tends to rise, easing social tensions (Pigina, 2015)

3.1.2 Impacts of Unemployment

Unemployment exacerbates the socio-psychological atmosphere in society, contributes to population marginalization, and increases the number of socially vulnerable people. The intensity of unemployment's economic, social, and political effects signals the need for active policy to regulate the labour market and stabilize employment (Goodwin, 2019).

Unemployment is one of the significant issues having a devastating impact on society's economy and catastrophic social, political, and moral consequences. Let's look at the primary drawbacks of unemployment.

3.1.2.1 Economic impacts

The pace of economic growth has a significant impact on the well-being of any state's economy. The amount of employment in a country is a crucial measure of economic growth

since its fall has a significant negative influence on the economy. Here are some examples of the economic impact of unemployment:

- Decrease in production happens when the amount of output is proportionate to the number of inputs, generally capital and labour (Owyang, Vermann, Sekhposyan, 2013). Therefore, an increase in unemployment greater than the norm can be directly related to a drop in production below its potential.
- The unemployment rate indicates how many people who want to work do not have one. As a result, real GDP often expands slower than usual when the unemployment rate increases and may even shrink (Mankiw, 2006).
- Since most people can't find jobs and most companies are downsizing, this can lead to lower incomes and people losing their professional qualifications (Bosenko, 2019).
- One of the most significant for impact on economy with increase of unemployment is decrease in tax revenues. Unemployment affects the amount of the country's GDP, resulting in a decrease in tax income to the state budget. This is related to a drop in taxpayers' taxable base (legal entities and individuals) (Gasnov, Aliev, Sulejmanov, 2011). State spending rises as unemployment rises.

From all the above, it can be concluded that if the unemployment rate increases, then the standard of living in the country and the population decreases.

3.1.2.2 Social impacts

Unemployment in the countries has many social consequences. Here are some of these problems:

- Unemployment is Increasing stress and health problems. Since people who have trouble finding a job have constantly panicked and experienced the stress associated with it, stress has been proven to be detrimental to health in the short term as well as in the long term.
- The decline of morals the loss of spirituality is one such factor in the social impact of unemployment on people. One example is that people who look for a job for an extended period and cannot find one tend to steal from others, and therefore human morals can be damaged.

- Increased social tension, means that society will more often try to go on strike because people will not be satisfied with the current situation and will likely not rely on their government, which could lead to a change in the structure of government
- Other social consequences can be increased psychological trauma, aggravation of interpersonal relationships, and family breakdown (Rose, 2019).

From this it can be concluded that unemployment worsens the social and psychological climate in society, leads to the population' marginalization, and increases the socially vulnerable segments of the population.

3.1.3 Unemployment in Kazakhstan and CIS countries

The Soviet Union's end and the establishment of 15 independent republics on its territory was one of the most significant events for CIS countries. The demise of such a powerful entity could not go ignored by the general public. All existing relations between the union republics were severed as a result of the signing of the Belovezh Agreement. Above all, the severing of these linkages had an impact on people's lives in the post-Soviet sphere. National ties deteriorated dramatically, resulting in inter-ethnic confrontations in nearly all the Union republics (Bazglin, 1994).

Experts estimate that at least 10% of Kazakhstan's population was in a bad financial situation in 1990. By the beginning of 1993, it is estimated that 50% of Kazakhstan's population was already below the poverty line, and the gap in living standards of various population groups was rapidly widening. The situation is complicated because the level of employment in Kazakhstan has traditionally been lower than in Russia (Frayner, 2008).

In the labour market, informal employment is actively forming. Employers avoid reporting their labour requirements to the Employment Service since doing so is illegal. Unemployed people and employees who are just on the company's payroll but do not get pay for an extended period of time make up the demand for jobs in this labour market sector. Unclaimed by the national economy are those with higher and secondary vocational education. A sizable proportion of them continue to work for the corporation, resulting in a

state of latent unemployment which is common among employees of state-owned enterprises (Malmberg-Heimonen, 2002).

3.2 Labour

The labour market is a network of economic relationships in which labour services are exchanged for material or intangible rewards (Rose, 2019). The labour market and employment are inextricably linked since they are the most significant social indicators that may be used to assess the efficiency of reforms, the country's national well-being, and the population's employment situations.

Employment is the activities of citizens linked with the fulfilment of personal and societal demands following state regulations and bringing them, in general, wages labour revenue. Legal employment is defined as any citizen activity connected to the fulfilment of personal and societal requirements and is not illegal (Brown, 1995).

3.2.1 Types of Labour

Types of labour employment govern modern population employment, help overcome the varied effects of socioeconomic crises, and speed the process of economic growth. The usage of all types of employment leads to macroeconomic efficiency (Brown, 1995).

3.2.1.1 Internal and external labour market

External organizational market - encompasses the field of labour circulation between organizations, focusing on geographical and professional mobility. The external labour market is distinguished by openness, accessibility, and competitiveness. Personnel selection and professional training in this market occur outside of the business. In the form of people movement, the external market entails unrestricted workers' movement across organizations (Lazear, 2004).

The organization's internal market is intimately linked to the external, i.e., regional labour market. A regional labour market organization is a buyer of labour and controls its demand. The organization executes the labour force consumption mechanism, determining

its price, structure, and reproduction cost. At the same time, the organization serves as a labour force provider to the area labour market (Lazear, 2004a).

The internal labour market is based on horizontal and vertical mobility of employees inside the business and is focused on the organization's personnel. The organization's internal market is limited and characterized by little competition. The internal market offers personnel with expertise and transfers this information from old to new employees. The organization's internal labour market ensures the balance of supply and demand inside the organization, producing professional and qualification features of workers in the form of professional skills, orienting to production changes and adapting employees to them (Lazear, 2004b).

3.2.1.2 Formal and informal labour market

Informal employment is one element of the shadow economy. Employers frequently want to avoid paying taxes in order to save money. As a result, unscrupulous companies pay their employees' salaries in cash envelopes to cut costs. In addition, additional requirements are that most of the employees are not going to court and their fear of losing their employment due to the labour market's restricted prospects. The high proclivity for informal employment is reflected not only in the trend of rising social vulnerability among employees but also in the fact that other variables impact the growth of informal employment. For example, the concealment of actual earnings and employers' miscalculation of the number of insurance contributions breach people's constitutional rights to obtain full labour pensions (Gandini, 2019).

British sociologist K. Hart states that informal employment is the essential and diversified self-employment characteristic of developing-country urban slum residents (Hart, 1973a). Hart has examined the labour market and its participants, including the urban poor, migrants, and unskilled workers. He saw self-employment as an alternative to unemployment because the official job market had nothing to offer them.

The primary causes of the growth of informal employment are poor governmental regulation: unemployment, high costs for company expansion, and high taxes (Hart, 1973b). Nonetheless, even the best management system can only reduce the repercussions, not

eradicate them. Even with the lowest taxes, a certain percentage of residents will refuse to pay them.

3.2.1.3 Primary and secondary labour market

The study of labour market segmentation resulted in the duality theory, which believes that the labour market is divided into primary and secondary. The grounds for categorizing employees into sectors are the worker's skill level and the difficulty for the employer to replace him or her. Workers with unique training and qualifications are not required in the secondary labour market. Workers in the primary labour market, on the other hand, have qualifications that need extensive training (Falkinger, 2002).

The main features of the primary labour market:

- Stable employment and job security for employees
- Wage levels are high (depends primarily on position, length of service, qualifications, responsibility)
- Excellent working conditions
- Creative work; frequently involved in production management.
- Excellent prospects for progression
- Employees must be highly qualified due to the use of innovative technologies.
- Respect for fairness and labour laws
- Bonuses, salary, and profit-sharing
- Long-term job security
- Convenient working days and hours Benefits and allowances
- Sick leave and vacation pay are both paid in full.
- Pension coverage that is guaranteed

The main features of the secondary labour market:

- Employee turnover is high, and employment is insecure.
- Wages are low.
- Inadequate working conditions
- Labour is executive and monotonous, with few development opportunities.
- Manufacturing technology is essential and labour-intensive.
- Top management that is overbearing

- Prevalence of basic pay
- Employee turnover is high; they are the first to be let go.
- Time constraints; frequently part-time (weekly); seasonal or temporary job
- Inadequate social security
- Short-term and straightforward training, usually in the workplace

3.3 Employment policy in Kazakhstan

The establishment of a market economy in Kazakhstan, the growth of the non-state sector of the economy, and the encouragement of entrepreneurial activity provide the groundwork for the establishment of a new system of relations relating to the purchase and selling of labour. With the move to market interactions, the exchange phase plays an increasingly important role in reproduction. Economic laws govern market connections (Frayer, 2008). Following them, it is feasible to develop some preliminary provisions, the adherence of which is required for the execution of valid market transactions. The following are the provisions:

- In any market, there is a process of purchasing and selling what the buyer does not have but wishes to acquire and what the seller has and wishes to sell.
- Purchasing and selling do not imply a change in ownership because the workforce is not always available to the buyer.
- Possession, use, and disposal are all powers granted to the owner.
- A sale-purchase transaction is an equal exchange defined by supply and demand rules in a competitive market (Nizova, 2017).

The extended employment crisis poses enormous threats to social and political stability. In Kazakhstan, government policy in the years 2014-2016 was increasingly focused on mitigating the consequences of the crisis on residents and the economy. The government believes that fulfilling Kazakhstan's long-term socio-economic development goals would necessitate the creation and implementation of policies focused on industrial building modernization and innovation, human resource development, and workforce quality enhancement. Everyone has the right to work freely, to choose their occupation and profession, according to Article 24 of the Republic of Kazakhstan's Constitution

(Amangeldy, 2016). Everyone has the right to work in a safe workplace that meets safety and hygienic requirements, as well as the right to fair labour remuneration and social security against unemployment. Kazakhstan's state guarantees in work and employment are a governmental responsibility to its residents, entailing the supply of physical or intangible benefits in conformity with national standards and generally recognized rules of international law. The state assures the supply of measures to boost the employment of specific demographic groups. Guarantees imply that these individuals have the right to participate in employment and employment programs, participate in training and advanced training, and receive support in seeking work (Amangeldy, 2016).

4 Practical Part

The first part of the practical part will consist of the main characteristics of Kazakhstan and its neighbouring Commonwealth of Independent States countries (the abbreviation CIS is used): Turkmenistan, Russia, Uzbekistan, Kyrgyzstan will be considered. Data will be taken from 2001 to 2020, if available. In order to see the full picture of the causes of unemployment in Kazakhstan, data from selected countries will be analysed and compared with Kazakhstan, mainly the following will be discussed and studied: basics of the economy, employment in the sectors (agriculture, industry, services), unemployment rate, monthly minimum wage. In the second part of the chapter, the extent to which various factors influenced unemployment in Kazakhstan over the observed time period of 20 years and which of these factors had a particularly high impact on unemployment will be examined by applying an econometric model. The factors and hypotheses mentioned in chapter 2.2 form the basis for the econometric model and will be explained again before the model is applied. First, however, basic comparisons between the economies of Kazakhstan and its neighbouring countries will be conducted.

4.1 Comparison of Kazakhstan and CIS countries

In order to be able to make possible statements on the labour market in Kazakhstan in comparison with the other selected CIS states, data on GDP growth, GDP per capita, employment in agricultural, industrial and services sectors and unemployment rates of the selected CIS countries were collected and analysed in this chapter. The developments are being compared with each other with a main focus on Kazakhstan. A period of 20 years from the last available data set was selected, so that data usually refer to the years 2001 to 2020. Only in the case of employment rates in the respective sectors was data only available up to 2019.

4.1.1 Characteristics of CIS countries

The first section of the thesis focuses on the comparison of the economic development of Kazakhstan and its neighbouring CIS countries which are Russia, Uzbekistan, Kyrgyzstan,

Turkmenistan. The Commonwealth of Independent States, in the following CIS, was established in 1991, including countries from the post-Soviet Union such as Azerbaijan, Armenia, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Uzbekistan, Ukraine, Georgia. Members endorsed the Alma-Ata Declaration on 21 December 1991 (Plokhy 2015). Upon its creation, the former republics' reiterated their willingness to cooperate in different foreign and domestic affairs and stated assurances of the former Soviet Union's international duties. The comparison of Kazakhstan with its neighbouring countries allows to draw conclusions regarding its economic and labour market development. It makes sense to compare these countries on the basis of two points. First, they are countries, in which a planned economy instead of a market economy existed. After the dissolution of the Soviet Union in 1991 and the attainment of independence, all of the economies underwent a transformation to a market economy, which was difficult to implement. This fact alone renders a comparison with Western countries problematic, since they had already developed at an earlier stage. The second reason for the appropriate comparison is geographic proximity. In this thesis, only the states directly bordering Kazakhstan were examined as also the geographical conditions, for example climate, of a country can affect the economic possibilities of a country substantially. Although a comparison with Russia, for example, is not necessarily useful in terms of geographic or climatic conditions due to its size, the comparison is worthwhile simply because of Russia's special status as the successor and largest economy of the former Soviet Union.

Kazakhstan (Republic of Kazakhstan) is in Central Asia. The neighbouring countries of Kazakhstan are China, Russia, Uzbekistan, Turkmenistan, Kyrgyzstan. By area, it is the ninth largest country worldwide, and its territory is equal to the whole of Western Europe. Furthermore, it is the largest landlocked country in the world. In terms of population, it is the smallest in the world. Despite its large area of about 2.7 million square kilometres, with 18.75 million, only comparatively few people live in the country, which is also evident from the population density of 7 per square kilometre (World Bank, 2020). Kazakhstan administratively has 14 regions and three cities of national importance: Almaty, Nur-Sultan, and Shymkent. The capital of Kazakhstan is Nur-Sultan.

4.1.2 Basis of economics in CIS countries

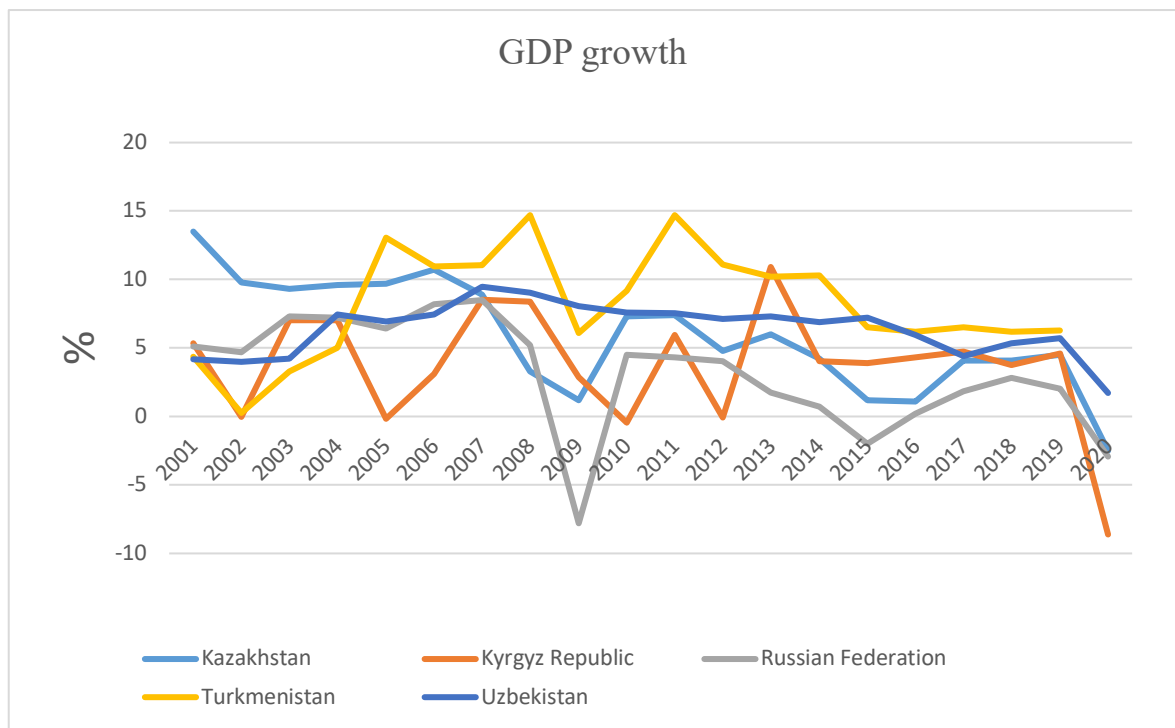
Kazakhstan's economy expanded rapidly in the 2000s, supported by higher global prices for the country's main exports: oil, metals, and grain. In 2006, extraordinarily high GDP growth was maintained, with the economy expanding by 10.7 percent. Kazakh's business with Russia's and China's rising economies and the neighbouring CIS countries, has aided in propelling this rise (Esanov, n.d.). However, after 2006 the GDP growth declined, further decreasing in 2008 due to the global financial crisis. After this, the country's GDP growth has seen a sharp increase from 1.1% in 2009 to 7.3% in 2010, which was the same for 2011. A level of a GDP growth of around 5% to 6% could be maintained until 2013, while seeing a bigger decline in the following years. This could be due to plummeting oil prices and the Russo-Ukrainian War. While growth remained at a low level between 2015 and 2016, it increased again thereafter, resulting in a value of around 4.5% in 2019. Subsequently, growth collapsed and reached a negative value of -2.5% for the first time in the observed 20 years, which means that the economy contracted during this period. This development is related to the outbreak of the COVID-19 pandemic and the subsequent introduction of measures against the spread of the virus.

Overall, the developments between the Kazakhstan and Russia, while not identical, are comparable, especially at times when Russia's growth shrinks, in which Kazakhstan's economic development also declines. However, the decline in growth in Russia is at times even more extreme than that of Kazakhstan. For example, growth falls from 5.2% in 2008 to -7.8% in 2009, which with -13% is the largest decline of all observed countries in the period covered. After recovering to 4.5% in 2010 and remaining at this level until 2012, it then slowly declined again until it fell into negative territory to around -2% as a result of the Russian annexation of Crimea. Growth then rises again, but as a result of the pandemic it falls back to the same level of -2.5% as Kazakhstan's growth.

Overall, it can be observed that GDP growth in all countries covered declines in the periods around the Russian annexation of Crimea and as a result of the COVID-19 pandemic. However, the decline is smallest in Uzbekistan, while the Uzbek curve is also the most stable on the whole. Although it also shows a sharp decline in 2020, growth is still the highest of all the CIS countries measured, at around 1.7%. The development of Turkmenistan and the Kyrgyz Republic differs from the other countries and is subject to large fluctuations in

growth. Particularly interesting here is the period from 2004 to 2005, in which growth is completely contrary. While the growth rate of the Kyrgyz Republic falls from 7% to -0.2%, growth in Turkmenistan rises from 5% to 13%. Apart from 2013, when Kyrgyzstan's GDP growth rises abruptly from -0.1% in 2012 to 11%, the countries' rates are largely comparable. Unfortunately, post-pandemic data are not available for Turkmenistan, so no conclusions can be drawn in this regard. However, the Kyrgyz Republic records the largest decline here, with its economy shrinking by -8.6% in 2020, the most among all recorded data.

Diagram 1: GDP growth in CIS countries



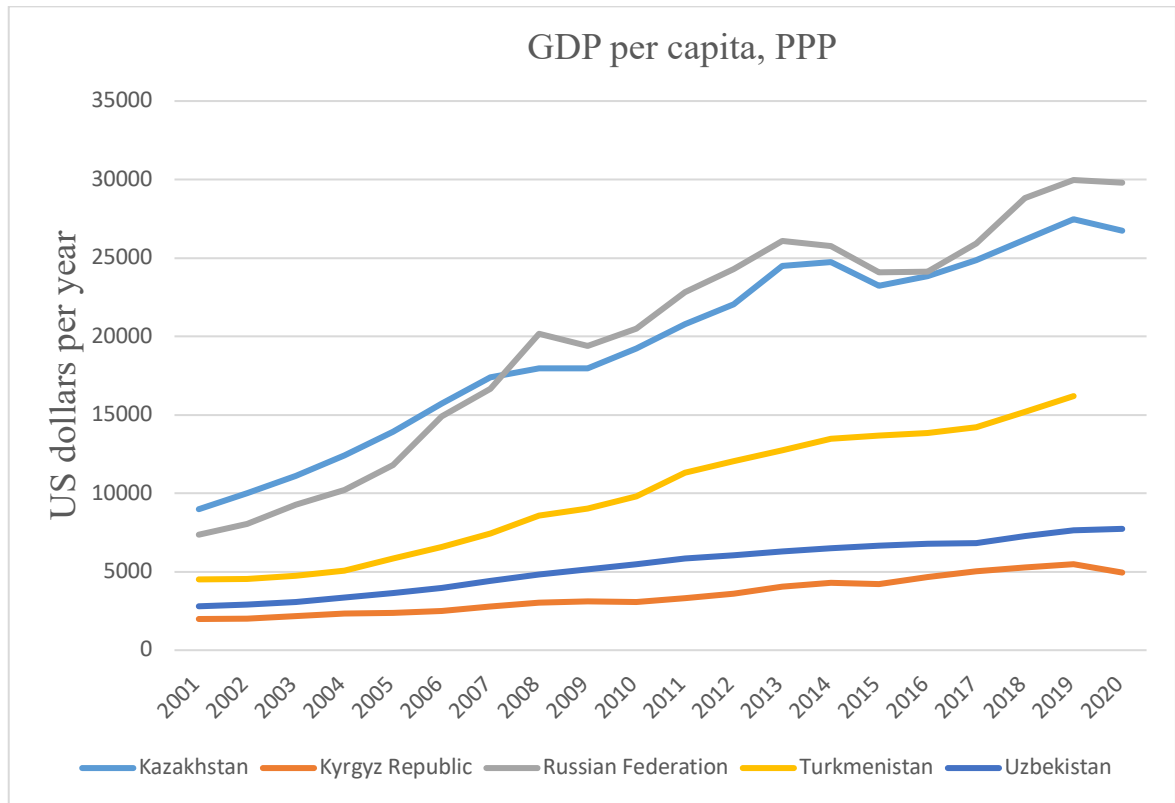
Source: World Bank, 2022a

After the comparison of GDP growth among the selected CIS countries, the countries' GDP per capita is presented in diagram 2. It can be used as an essential indication tool of economic success and is a helpful unit for comparing average living standards and economic well-being across countries. In general, the GDP per capita is rising in every country for the observed 20 years, which can be seen as a positive sign in relation to improvements in economic well-being and therefore increased living standards.

The developments can be grouped into three parts: First, there are the developments of the Russian Federation and Kazakhstan. These are very comparable with each other. Of all the countries observed, these two countries show the largest increase in GDP per capita over the twenty-year period. While GDP per capita in 2001 is \$7,361 in Russia and \$8,986 in Kazakhstan, these values have increased substantially by 2020. This year, they are \$26,754 in Kazakhstan and \$29,812 in Russia. Here, too, deviations from the development in the periods of the global financial crisis, the annexation of Crimea, as well as the pandemic can be seen. In the years 2008 to 2009 as well as 2013 to 2015, the decrease is higher for Russia, and from 2019 to 2020 Kazakhstan records a higher drop. Overall, Kazakh economy's sensitivity to commodity price swings and other external shocks can be explained with its overreliance on a restricted production base and a highly concentrated export basket. Therefore, the GDP per capita declined for example during the financial crisis. Nevertheless, these developments are noteworthy against the backdrop that Russia is the largest country and has more than 30% of the world's national resources (Sonnichsen, 2021).

On the other side of the diagram are the Kyrgyz Republic and Uzbekistan. Although these countries have also seen their GDP per capita rise over the years, the increase is much less steep than that of the other countries. From 2001 to 2020, this figure will rise from \$1,987 to \$4,965 in Kyrgyzstan and from \$2,798 to \$7,734 in Uzbekistan. While the financial crisis and the annexation of Crimea have no discernible effect on growth, the consequences of the pandemic are particularly evident for Kyrgyzstan, where GDP per capita is falling. Turkmenistan cannot be assigned to either of these two groups, and its development falls between the two described above. In 2001, GDP per capita here was \$4,511 while in 2019, the latest available data set, it is \$16,196. Accordingly, Turkmenistan's overall growth is steeper than that of Uzbekistan and Kyrgyzstan, although it does not come close to that of Kazakhstan and Russia.

Diagram 2: GDP per capita, PPP in CIS countries



Source: World Bank, 2022b

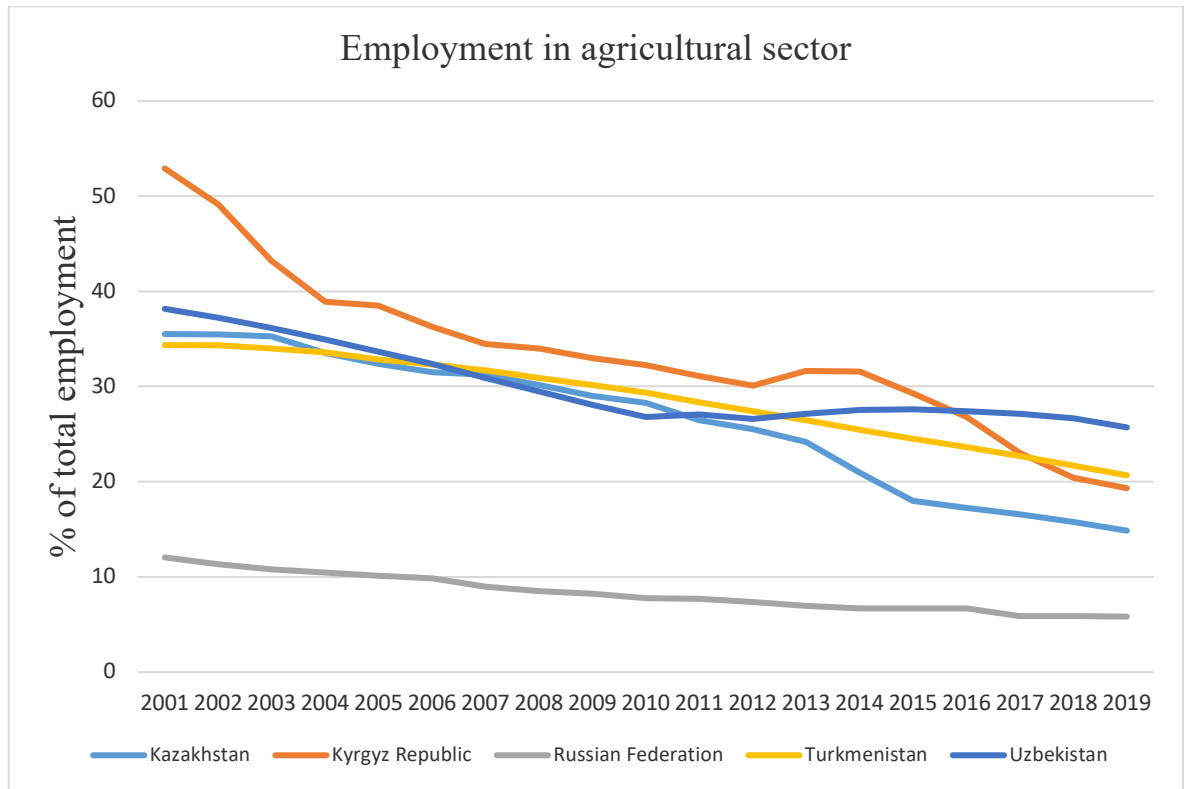
After both values, nominal GDP per capita and GDP growth in percent, have been analysed for the CIS countries under review, they can be put into context. Overall, GDP per capita shows that the productivity of Kazakhstan and Russia is very similar. Both experience comparable growth and both settle in a comparatively high value. This comparability is also evident in the development of GDP growth. As an indication that the economies of Russia and Kazakhstan are closely linked and that they are economically more prosperous and thus have higher standards of living than the other CIS states analysed. In the following, this first assumption will be examined in more detail.

4.1.3 Most important employment in sectors in CIS countries

The following section shows and describes the distribution of the CIS countries' employment by sector from 2001 to 2019. This should enable statements to be made about the development level of the countries. Especially in the agricultural sector, the complete coverage of labour activity is not easy and depends on the time of the survey, as this changes

seasonally in this sector. In addition, there is a high level of informal employment, which cannot always be quantified. The graph of the agriculture sector generally shows a decline in the employment ratio for every country (see diagram 6). Notable among these is Kyrgyzstan, which in 2001 had about 53% agricultural employment, but in 2019 it is only 19%, ranking third among CIS countries. Far lower than the other states is the employment ratio for Russia, which is at a constantly declining level between 11% in 2001 and 6% in 2019. In Kazakhstan, the employment rate is around 35% in 2001, which will fall to 15% by 2019. The decline is particularly sharp from 2013 onward. It is striking that the employment rates of Kyrgyzstan and Uzbekistan show a slight increase in the same period before falling again. While this always could be related to changing weather conditions leading to an increase or decrease of agricultural crops, there are other reasons which can be referred to for the sectoral development of each country. The constant curve in Uzbekistan, for example, could be explained by diversification of agricultural products, land use optimization, and investment, tax, and development support from the state, which continues to place a major emphasis on its agricultural sector (Khaydarov, 2015). Generally speaking, it can be stated that the curves of the other CIS countries show significantly more employment compared with the Russian Federation. However, this difference is becoming increasingly smaller, so that the difference between the Russian Federation and Kazakhstan is only around 10% in 2019.

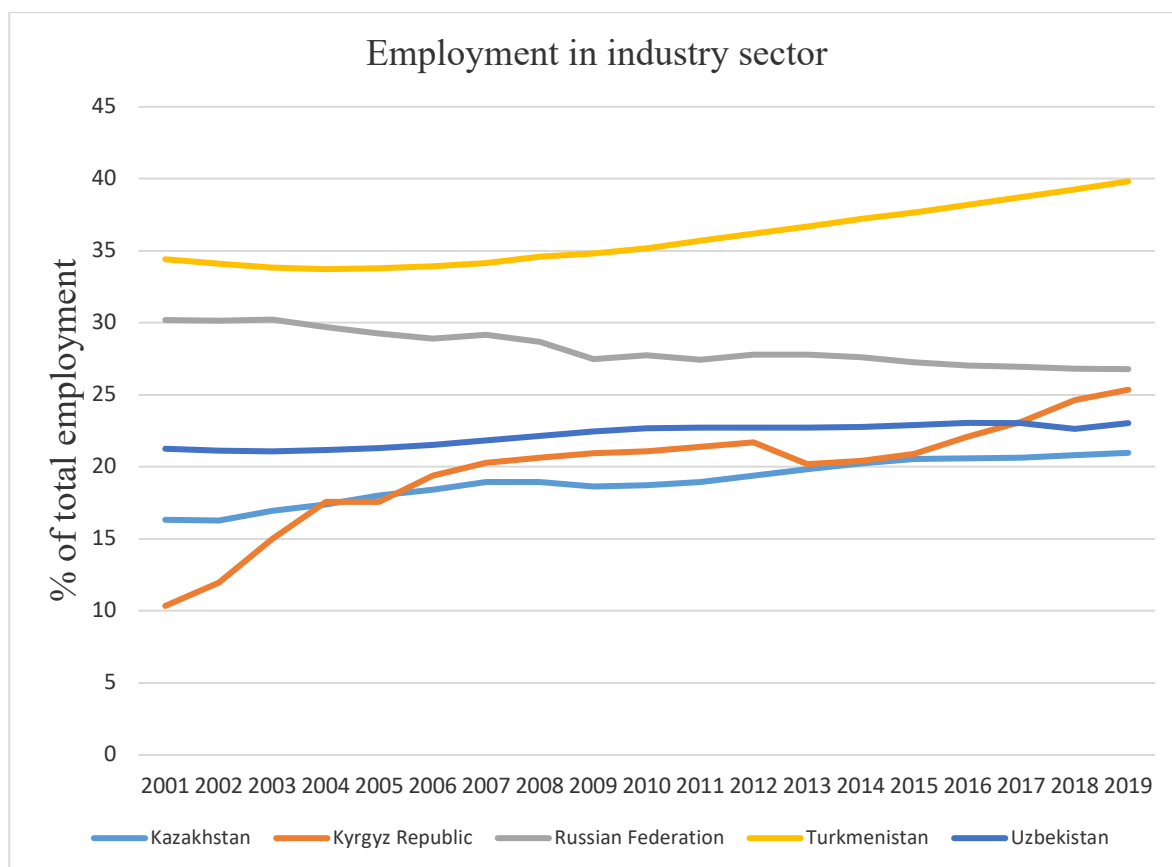
Diagram 3: Employment in agricultural sector in CIS countries



Source: The World Bank Group, 2022c

The graph of the industrial sector differs substantially from that of the agricultural sector. Employment in the industrial sector increases in all countries from 2001 to 2019, but it decreases in the Russian Federation. At the same time, the growth for Kazakhstan and Uzbekistan, which show a comparable development of employment, is only less than 5% each. Kyrgyzstan’s growth is the highest in this sector. While the employment is about 12% at the beginning, it raises sharply up to 18% in 2004 before the figure reaches 25% in 2019, which is higher than the employment rates of Kazakhstan (21%) and Uzbekistan (23%) in this sector. Again, it is noticeable that the ratio in Kyrgyzstan decreases from 2012 to 2013 while it increases in the countries’ agricultural sector in the same period. Turkmenistan is the country with the highest share of employment in the industrial sector. From about 34% in 2001, this takes a constant growth to about 40% in 2019. The Russian Federation has the second largest population share in the industrial sector, which decreases slightly from 30% to about 27%.

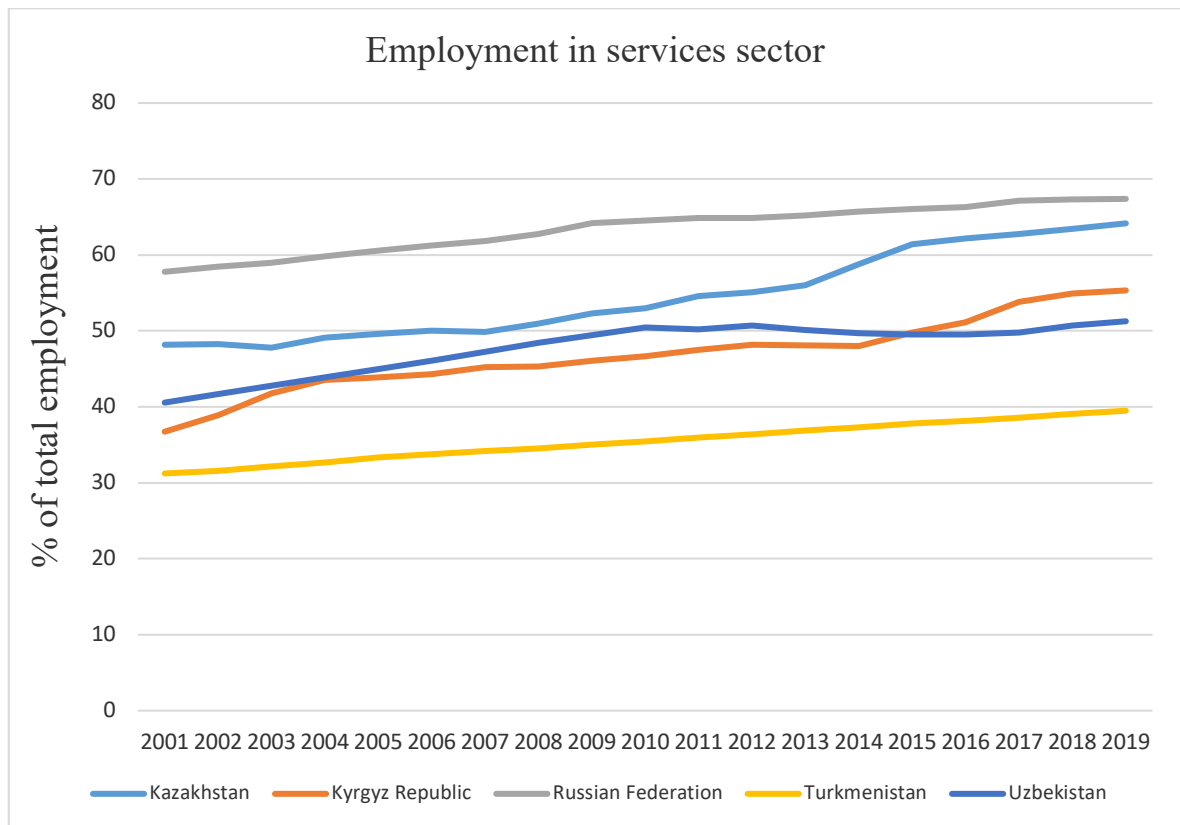
Diagram 4: Employment in industry sector in CIS countries



Source: The World Bank Group, 2022d

These developments are also accompanied by the development of employment in the service sector (see diagram 5). Here, the Russian Federation consistently shows the highest value, which is growing from 34% in 2001 to 41% in 2019. Kazakhstan also has a comparatively high share in the service sector. Following growth of around 16% since 2001, its share of 64% in 2019 is only three percent below that of Russia. Uzbekistan also has reasonably constant growth, although this declines slightly in 2010 and 2012. In this regard, it is noteworthy that there is an almost mirrored curve here to the development in the agricultural sector for the same period (see diagrams 3 & 5). This shows that more people stayed in the agricultural sector in the years from 2010 onward, so that growth in the services sector also declined. Additionally, Kyrgyzstan has also seen rapid growth in the service sector, which has increased sharply, especially in the beginning and from 2014 onwards. This is also accompanied by a decline in the share of employees in the agricultural sector. The lowest, but also the most constant, growth in the share of employment is in Turkmenistan. While the value in 2001 was about 36%, it rises to about 39% in 2019.

Diagram 5: Employment in services sector in CIS countries



Source: The World Bank Data, 2022e

All in all, these developments can be explained by the three-sector hypothesis and tertiarization, which were essentially developed by Jean Fourastié. According to this hypothesis, the focus of a country's economic activity shifts first from the primary sector to the secondary and then to the tertiary sector. Initially, fewer and fewer workers are needed in the primary and secondary sectors due to productivity increases resulting from technical progress. Furthermore, more and more job opportunities arise in the third sector, such as tourism. In highly developed countries, the tertiary sector usually accounts for the largest share of employees. Fourastié was extremely optimistic about the development and predicted increasing prosperity, social security, flourishing education and culture, and the elimination of unemployment. It has since become apparent that service-oriented societies are also experiencing unemployment (Fourastié, 1949). In the following, the unemployment rates of the CIS countries will be described and compared with each other.

4.1.4 Unemployment rate in CIS countries

In this chapter, the unemployment rates will be discussed on the selected CIS countries. The unemployment rate refers to the share of the labour force that does not have a job, but is available and looking for employment. The criteria for recording the rate vary from country to country, which must also be taken into account when comparing the values. Therefore, the values have been harmonized by the World Bank to compensate for differences in data origin and other country-specific differences. This indicator is based on the labour force and not on the total population.

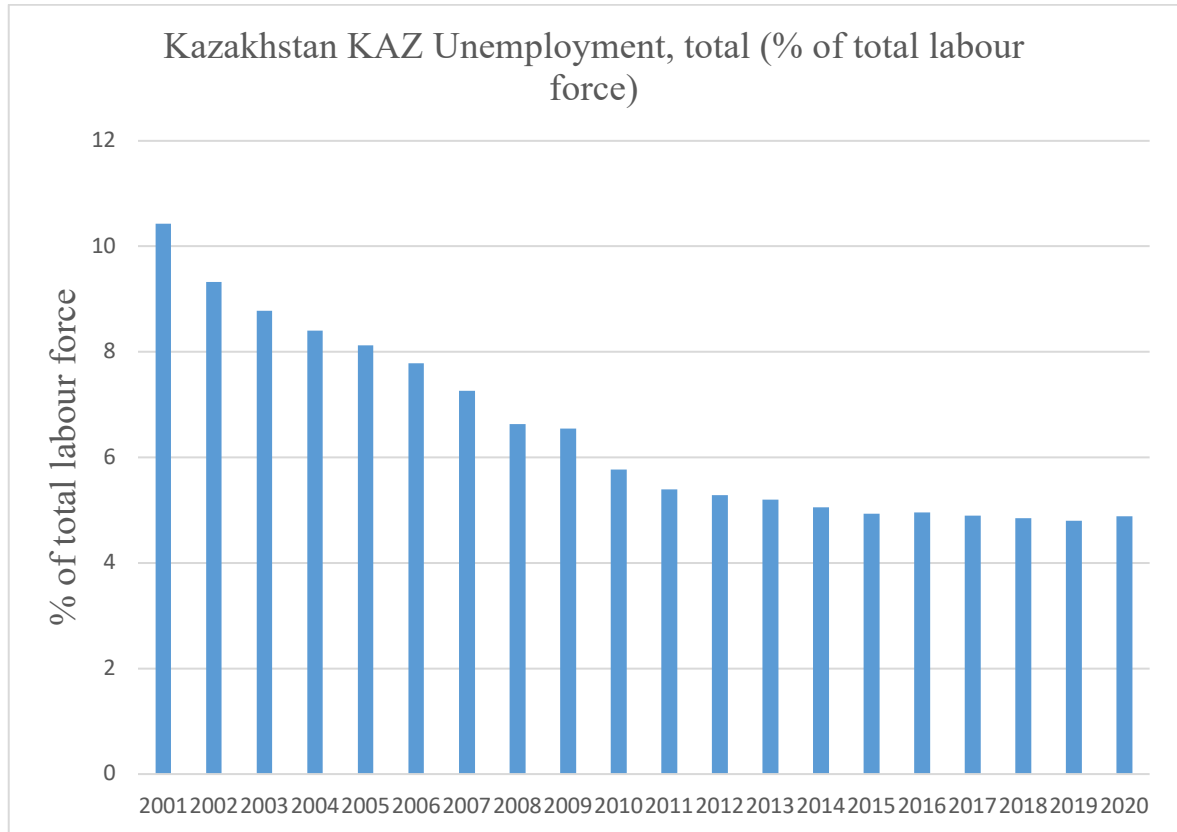
In general, Kazakhstan has mostly natural or cyclical unemployment. It is one of the largest wheat producers globally, therefore seasonal unemployment is one of the common types of unemployment for Kazakhstan. As highlighted in previous chapters, seasonal employment complicates the actual recording of unemployment.

Its unemployment rate has been gradually declining since 2001 (see diagram 6). From almost 11% of unemployment in 2001, this value decreased until 2020, where the rate lays at around 5% of unemployment which is the lowest from the neighboring countries. While there is a rapid decrease of unemployment in the early 2000s, this decline becomes increasingly flat from the year 2011 where barely any changes are visible. It is noticeable that from 2019 to 2020, a small increase in the unemployment rate is visible, even if this increase is only minimal. It is striking that this increase is still surprisingly small in the wake of the Corona pandemic, which will be further discussed later in the comparison between the countries' unemployment rates.

What at first looks like a stable and positive development is often characterized as insufficient and underestimated coverage. This is mainly due to the coverage of unproductively self-employed workers, who thus work along at their own risk. As a rule, they do not conclude formal employment contracts and do not have normal working conditions, adequate social protection or effective representation of their interests by trade unions and similar organizations (IMF, 2014). These are recorded as "inactive" by the methodology, which, however, does not count them as unemployed. Furthermore, individuals are not recorded as unemployed until they report to an appropriate agency to receive help in finding work. Not everyone claims this either, so that even fewer unemployed

persons are recorded. Overall, these points mean that the unemployment rate may continue to fall, although it should rise in some cases.

Diagram 6: Unemployment rate in Kazakhstan



Source: World Bank, 2022f

Overall, most CIS states have a similar trend of declining unemployment rates (see diagram 7). While unemployment rates were quite high in 2001, ranging from 8% to 12%, this figure progressively decreased and stabilized between 4% and 6% until 2019. The biggest exception to this is the development of Kyrgyz unemployment rates, which appear to be quite volatile according to World Bank data. While the Kyrgyz Republic’s rate was less than 8% in 2001, it has since risen sharply, increasing by 4.5% to 12.5% in 2002. The introduction of the labour force survey in 2002 could be one explanation for the high increase between 2001 and 2002. Previously, the unemployment rate was calculated by estimating the labour force balance, which may not have been as accurate as the newly established survey (ILO, 2008). Nonetheless, Kyrgyzstan’s unemployment rate in 2002 was 2.5% higher than that of the other CIS countries, surpassing Uzbekistan’s second highest rate by 2.5%. After 2002, Kyrgyzstan’s unemployment rate falls again until it meets the level of the other countries, with a rate of 8.5% in 2004. On this level, the trend stabilizes with tiny dips and

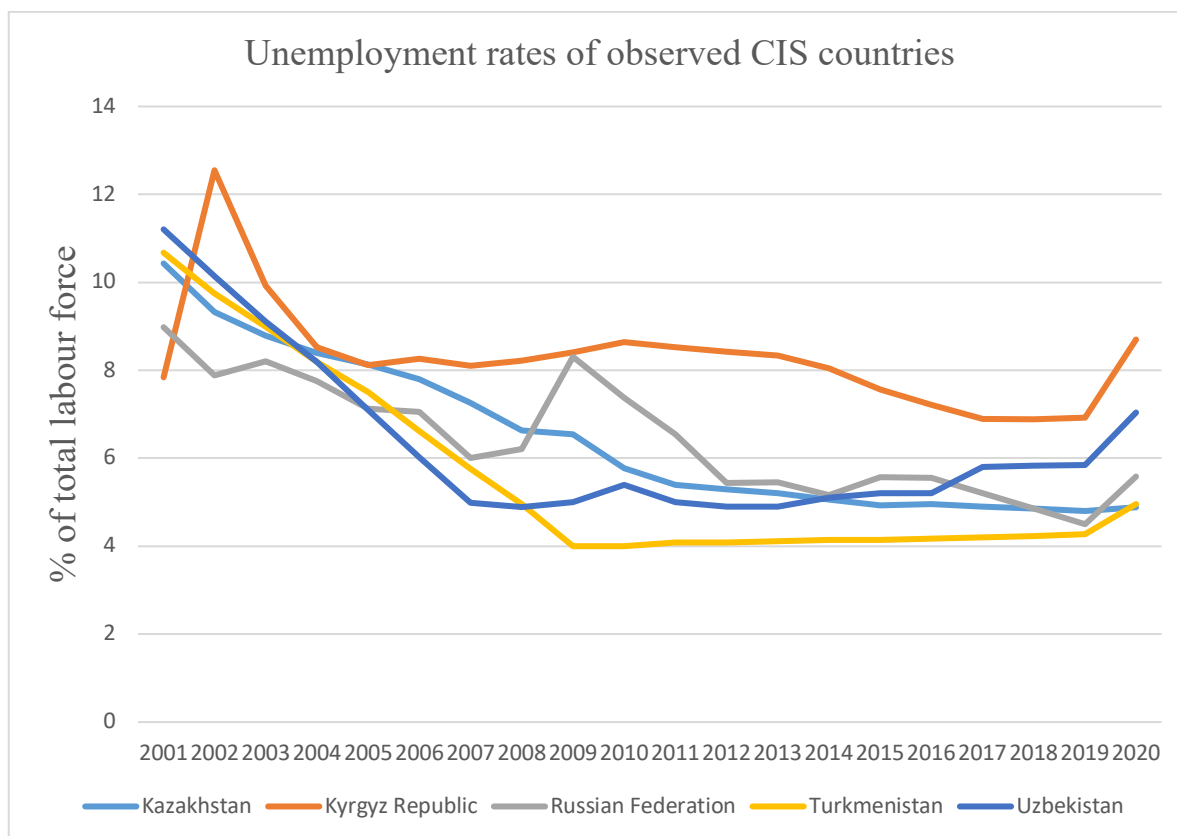
increases from the start of the financial crisis in 2008 until 2010, when unemployment begins to fall again. This drop continues until 2019, when a sharp increase in unemployment is seen until 2020. This year, the Kyrgyz government acted promptly and enforced stringent measures to combat the COVID-19 pandemic. As a result, the Kyrgyz Republic's economy suffered the consequences of the limitations, and many people lost their jobs (Dzushupov, 2021).

Uzbekistan's unemployment rate is similar to that of the Kyrgyz Republic. While the unemployment rate in 2001 was around 10%, it has since dropped to 5%. From 2008 to 2010, there is a small increase to around 5%, after which the number drops and stabilizes around 5% until 2016. After two sharp increases in the years 2016 and 2017, as well as 2019 and 2020, Uzbekistan's unemployment rate reaches 7% in 2020, making it the CIS country with the second highest unemployment rate in 2020.

The development of unemployment in Turkmenistan differs from the countries described so far. While the unemployment rate in 2001 was still around 10%, the curve has taken an almost linear negative course, so that in 2009 this value is only 9%. By 2019, this figure will have risen only minimally by 0.3%. The consequences of the pandemic are also evident here, but to a lesser extent than in Uzbekistan and Kyrgyzstan. From 2019 to 2020, the unemployment rate will rise slightly to around 5%.

In contrast, the Russian Federation's unemployment rate development differs from that of the other countries. Overall, the rate declines from around 9% in 2001 to 5% in 2020. Aside from a gradually decreasing trend, the sharp increase in the unemployment rate from around 6% in 2008 to around 8.5 percent in just one year is striking. The Russian Federation nearly reaches its highest unemployment rate in the last twenty years, with the financial crisis leading to cutbacks and reduced production due to falling demand (ILO, 2009). When compared to the other countries' curves, it is clear that Russia's economy suffered more from the global financial crises than the other countries' economies. While the rate falls again until it reaches 5.5% in 2012, a lower value than before 2008, the curve stabilizes with minor ups and downs before rising sharply by one percent from 4.5% in 2019.

Diagram 7: Unemployment rates of observed CIS countries



Source: World Bank, 2022f

Among all CIS countries, the Kazakh economy demonstrates the greatest consistent decline in unemployment rate. Whether it is due to the introduction of surveys, the financial crisis, or the COVID-19 pandemic, every country has experienced a significant increase in unemployment over the last twenty years of measuring. While there is a minor gain of 0.3% from 2008 to 2009, it is the least among the CIS countries during the global financial crisis. The same is applicable for the pandemic, when every country experiences a substantial increase in unemployment. Kazakhstan's economy builds the only exception here with an increase of unemployment of barely 0,1%. There are several potential reasons for this development. On the one hand, this could be because the strictness of the measures implemented by the Kazakh government during these times did not compare to other nations, resulting in relatively little effects on the country's unemployment. On the other hand, this could indicate that the Kazakh labour market is more stable than the ones of the other

observed CIS countries. However, the main potential reason for the low unemployment rate and the small variations in it is the data collection methodology described at the beginning of this chapter. Since the data collected are thus likely to be underestimated, it is difficult to make conclusive statements on the comparison with the other countries. In addition to that, there could be hidden unemployment already described in Chapter 3.1.1.5, which would add up to the numbers of unemployed people that are not fully covered in this rate. Nevertheless, this shows that official developments in the labour market are mostly detached from developments in other CIS countries.

In summary, the unemployment rate has decreased in all countries within the observed period of time. While in principle low unemployment rates may also exist in countries with substantial poverty, or high unemployment rates can also occur in highly economically developed countries, some assumptions can nevertheless be made. The trend of a decline in unemployment may also indicate that the economies of the CIS countries are stabilizing overall after a major recession in the 1990s in the wake of the collapse of the Soviet Union and the subsequent independent development of a market economy. Furthermore, the small rises in unemployment in the CIS countries during the global financial crisis in 2008 may indicate that they were not as connected to global markets or as affected by the crisis at that time as, for example, Russia, which experienced a large increase in unemployment during this period.

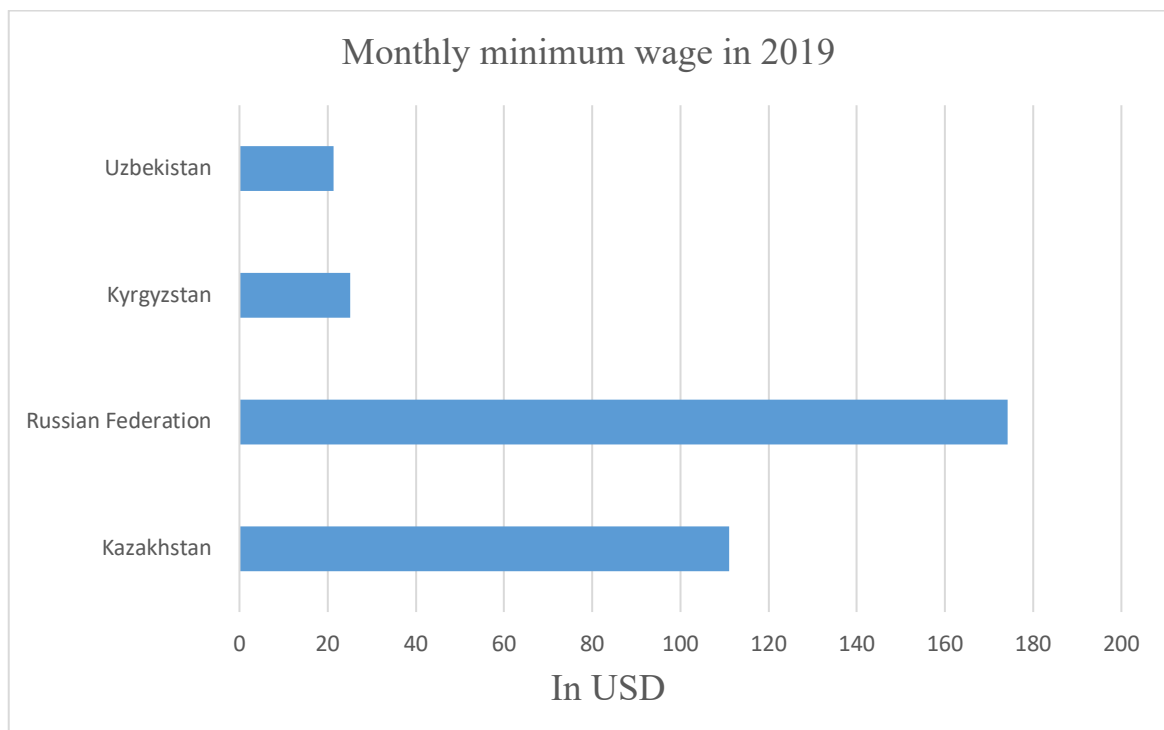
4.1.5 Minimum wage in the selected countries

In this chapter the minimum wages of the respective countries will be conducted in order to be able to make possible statements on them. There is no value for Turkmenistan, as no data is available for it. The data are from the year 2019 and they are compared with the exchange rate of 01.01.2019 of the U.S. dollar to obtain a single currency. The minimum wage is defined as "the minimum amount of remuneration that an employer is required to pay wage earners for the work performed during a given period, which cannot be reduced by collective agreement or an individual contract" (International Labour Office, 2014). It should serve as one of several instruments to prevent poverty and help people meet the needs of themselves and their families by pursuing work. As a social protection instrument, it also protects workers from being exploited by employers by working for insufficient pay. Thus, a minimum wage can provide valuable information about the social security of workers in a

country, although the level of the minimum wage is also always dependent on the average income as well as the cost of living in the country (International Labour Office, 2014).

The figure quickly shows that there are marginal differences between the CIS countries. While the minimum wage of the Russian Federation is the highest with a value of \$174.24, as expected, the value of Kazakhstan is \$111.04. While there is still a high difference here, it is not too great compared to Russia, whose economy is considered the most advanced overall. Especially in comparison with Kyrgyzstan and Uzbekistan, this value seems all the more astonishing, because their minimum wages are considerably lower. While the minimum wage in Kyrgyzstan is the equivalent of \$24.08, that of Uzbekistan is somewhat lower at \$21.34. Although these figures are dependent on the cost of living in each country, this large difference may also indicate advanced social security in Kazakhstan compared to the other CIS countries except Russia. It could be assumed that this value is highest in developed Russia. However, the fact that there is such a large difference between Kazakhstan and the other two countries allows for the very assumptions made.

Diagram 8: Monthly minimum wage in 2019



Source: ILO, 2021

4.2 Econometrics analysis: Factors influencing Kazakh unemployment

After the general classification of Kazakhstan's economic situation in comparison with the other selected CIS countries was carried out in the first section of the practical part of this thesis in order to put the unemployment rate in Kazakhstan into context, the second practical part is carried out in this chapter. Here, the aim is to conduct an econometric analysis on the factors that might influence unemployment in Kazakhstan.

4.2.1 Economic and econometric model

At first, the factors which are assumed to influence Kazakhstan's unemployment rate are mentioned. After that, the underlying econometric model will be illustrated and the variables used in this model will be declared.

Economic model:

For the economic model it is assumed that the development of unemployment rate in Kazakhstan is dependent on Foreign Direct Investment (FDI), inflation, annual growth of GDP, urban population growth, the time required to start a business, research and development expenditure, corruption perception index, income from tourism and development of inflation rates for consumer goods.

Equation 1: Economic model

$$y_{1t} = f(x_{2t}, x_{3t}, x_{4t}, x_{5t}, x_{6t}, x_{7t}, x_{8t}, x_{9t}, x_{10t})$$

Equation 2: Econometric model

$$By_{1t} = \gamma_{12} x_{2t} + \gamma_{13} x_{3t} + \gamma_{14} x_{4t} + \gamma_{15} x_{5t} + \gamma_{16} x_{6t} + \gamma_{17} x_{7t} + \gamma_{18} x_{8t} + \gamma_{19} x_{9t} + \gamma_{10} x_{10t} + u_{1t}$$

Declaration of variables:

Y_{1t} ... Unemployment, total (% of total labour force) (modeled ILO estimate)

X_{2t} ... Foreign direct investment, net inflows (BoP, current US\$, in millions)

X_{3t} ... Inflation, GDP deflator (annual %)

X_{4t} ... GDP growth (annual %)

- X5t ...Urban population growth (annual %)
 X6t ...Time required to start a business (days)
 X7t ... Research and development expenditure (% of GDP)
 X8t ... Corruption Perceptions index (0 - low, 100 - high)
 X9t ... Income from Tourism (in mil USD)
 X10t ...Development of inflation rates for consumer goods
 U1t ...Random error, $\sim \text{nid}(0, \sigma^2)$

Table 1: Data from 2001–2020 of dependant and independent variables (Y1–X5)

	Y1	X2	X3	X4	X5
Years	Unemployment, total (% of total labour force) (modeled ILO estimate)	Foreign direct investment, net inflows (BoP, current US\$, in millions)	Inflation, GDP deflator (annual %)	GDP growth (annual %)	Urban population growth (annual %)
2001	10.43	2,816.82	10.16	13.50	-0.04
2002	9.33	2,588.49	5.80	9.80	0.13
2003	8.78	2,483.25	11.74	9.30	0.47
2004	8.40	5,615.26	16.13	9.60	0.82
2005	8.13	2,546.07	17.87	9.70	1.02
2006	7.79	7,611.17	21.55	10.70	1.19
2007	7.26	11,972.84	15.53	8.90	1.27
2008	6.63	16,818.89	20.94	3.30	2.00
2009	6.55	14,275.89	4.69	1.20	2.11
2010	5.77	7,456.12	19.54	7.30	1.54
2011	5.39	13,760.29	20.54	7.40	1.56
2012	5.29	13,648.13	4.79	4.80	1.54
2013	5.20	10,011.29	9.50	6.00	1.57
2014	5.06	7,308.11	5.77	4.20	1.60
2015	4.93	6,577.82	1.82	1.20	1.59
2016	4.96	17,220.96	13.64	1.10	1.55
2017	4.90	4,712.63	11.21	4.10	1.49
2018	4.85	83.41	9.21	4.10	1.47
2019	4.80	3,718.63	7.63	4.50	1.48
2020	4.89	7,406.53	4.21	-2.50	1.52

Source: Own work after WorldBank (2022g), UNESCO (n.d.), WorldData (2022)

Table 2: Data from 2001-2020 of dependent and independent variables (X6-X10)

	X6	X7	X8	X9	X10
Years	Time required to start a business (days)	Research and development expenditure (% of GDP)	Corruption Perceptions index (0 - low, 100 - high)	Income from Tourism (in mil USD)	Development of inflation rates for consumer goods
2001	32	0.220	79	502	8.35
2002	32	0.255	79	680	5.84
2003	32	0.253	76	638	6.44
2004	32	0.248	78	803	6.88
2005	31	0.284	74	801	7.58
2006	27	0.243	74	973	8.72
2007	27	0.210	79	1210	10.85
2008	27	0.216	78	1260	17.14
2009	26	0.229	73	1190	7.32
2010	25	0.154	71	1240	7.4
2011	25	0.154	73	1520	8.42
2012	25	0.165	72	2150	5.1
2013	18	0.171	74	2370	5.85
2014	16	0.167	71	2240	6.71
2015	11	0.169	72	1830	6.67
2016	9	0.147	71	2040	14.55
2017	9	0.139	69	2360	7.44
2018	5	0.132	69	2650	6.02
2019	5	0.124	66	2920	5.25
2020	5	0.116	62	589	6.75

Source: Own work after WorldBank (2022c), UNESCO (n.d.), WorldData (2022)

4.2.2 Parameters' estimation using OLSM in Gretl

In order to understand the impact of every selected independent variable for the unemployment rate in Kazakhstan, the Ordinary Least Square Method (OLS) will be used.

Table 3: OLS results from GRETL based on Matrix X and Vector Y

Model 1: OLS, using observations 2001-2020 (T = 20)				
Dependent variable: Y1				
	coefficient	std. error	t-ratio	p-value
const	6.79319	3.61243	1.881	0.0894 *
X2	-4.40541e-05	4.06917e-05	-1.083	0.3044
X3	-0.0918908	0.0398715	-2.305	0.0439 **
X4	0.222039	0.103372	2.148	0.0573 *
X5	-0.426235	0.505828	-0.8426	0.4191
X6	0.0253221	0.0392334	0.6454	0.5332
X7	8.63055	4.25362	2.029	0.0699 *
X8	-0.0324834	0.0632878	-0.5133	0.6189
X9	-0.000677571	0.000281331	-2.408	0.0368 **
X10	0.194315	0.0807226	2.407	0.0369 **
Mean dependent var	6.466900	S.D. dependent var	1.773468	
Sum squared resid	1.412168	S.E. of regression	0.375788	
R-squared	0.976369	Adjusted R-squared	0.955101	
F(9, 10)	45.90768	P-value(F)	5.87e-07	
Log-likelihood	-1.872713	Akaike criterion	23.74543	
Schwarz criterion	33.70275	Hannan-Quinn	25.68920	
rho	0.103965	Durbin-Watson	1.741477	
Excluding the constant, p-value was highest for variable 9 (X8)				

Source: GRETL

Based on the above results from the GRETL estimation, the next equation can be identified which will help to further analyse the impact of each factor on the unemployment rate of Kazakhstan (KZ).

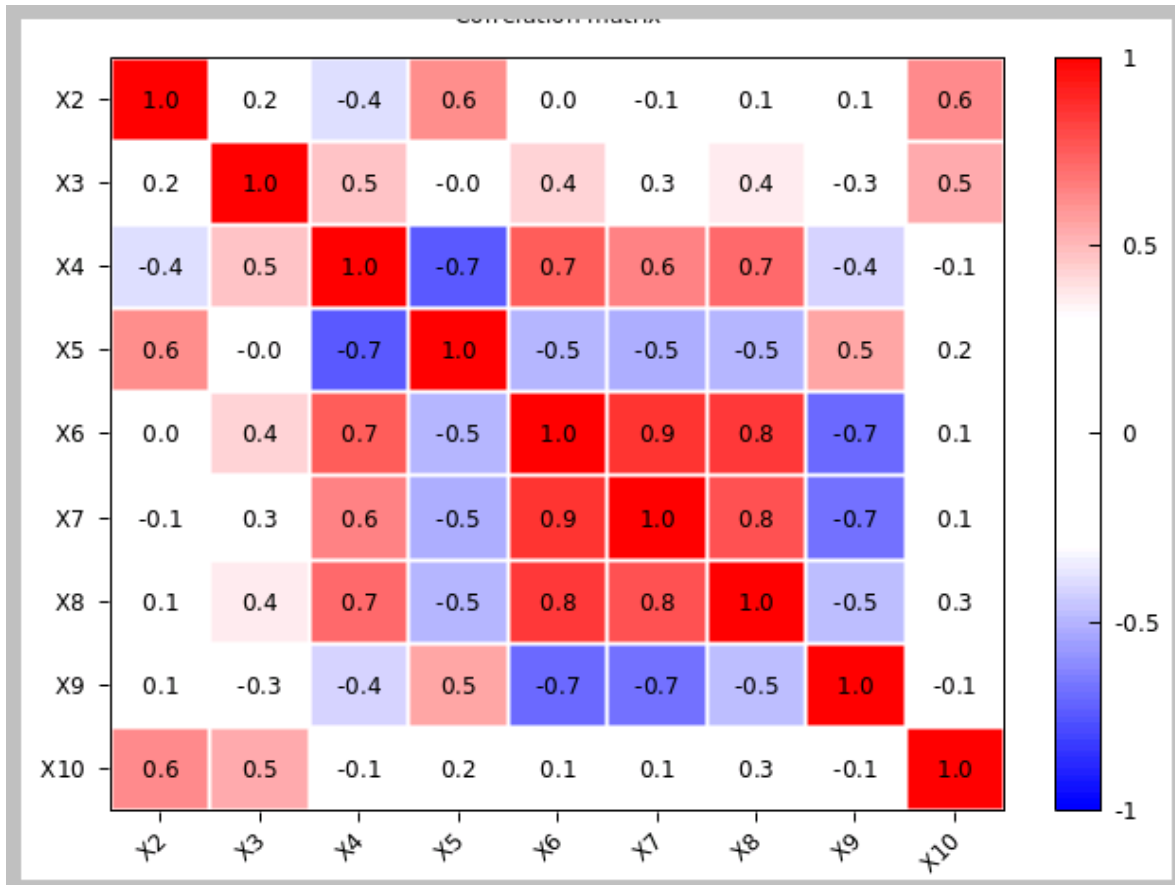
Equation 3: Econometric model with values from GRETL

$$Y1 = 6.79319 - 0.004 X2t - 0.09 X3t + 0.22 X4t - 0.43 X5t + 0.025 X6t + 8.63 X7t - 0.03 X8t - 0.0006 X9t - 0.19 X10t + Ut$$

4.2.3 Correlation Analysis

In the following, the correlation matrix will be shown and described (see table 4).

Table 4: Correlation matrix



Source: Own work

The correlation matrix shows a high dependency between independent variables in this model. The correlation rate can be expressed using the Pearson correlation coefficient (r). It is a statistical indicator of the strength of a linear relationship between paired data. The calculation is made using the GRETL Program (CORREL). Positive r values mean positive linear correlation, while negative r values indicate negative linear correlation. A value of zero means that there is no linear correlation between variables. The closer the value is to 1 or -1, the stronger is the linear correlation. Furthermore, it is advisable to compare the Pearson coefficient with the values of the following scale (MathStat, 2014, p. 4):

- 0.00 - 0.19: “very weak”,
- 0.20 - 0.39: “weak”,
- 0.40 - 0.59: “medium”,
- 0.60 - 0.79: “strong”,
- 0.80 - 1.00: “very strong”.

From the Equation 3 the estimated parameters show how the unemployment rate in KZ will change if any of the explanatory variables will vary.

- If all values of all independent variables will be equal to zero, then the unemployment rate will be equal to 6.79 % of total labour force.
- If the FDI net inflow will increase for 1 million USD, then unemployment rate will decrease by 0.004 % per annum.
- An increase in inflation per 1% will lead to a decrease of the unemployment rate of 0.09%.
- If annual growth of GDP will increase for more than 1%, it will lead to an increase of unemployment of at least 0.22%.
- The growth of urban population will lead to a decrease of the unemployment rate at least for 0.43 per annum.
- An increase in the time required to start a business will lead to an increase in the unemployment rate. In case of one day increase, this would increase unemployment for 0.025%.
- An increase on expenditures for research and development would negatively impact unemployment development and increase unemployment rate.
- A decrease in corruption perception will positively effect unemployment rate. One index improvement will lead to 0.03% decrease on unemployment.
- The income through tourism seems not to be an as important factor on unemployment. If income from tourism would decrease by 1 million USD then it will lead to an increase on unemployment of only 0.0006% per year.
- An increase in inflation rate for consumer goods in Kazakhstan by at least 1% would lead to a decrease of unemployment rate for 0.19% per annum.

Statistical verification (statistical significance of parameters; R2):

The significance of parameters is another way to analyse the impact of all the independent variables against unemployment rate.

Based on OLS results, the P-values can be checked and statistical significance of parameters can be made.

Table 5: Significance of variables

	<i>p-value</i>	<i>Level of significance</i>	<i>Result</i>
Constant	0.0894	0.05	Parameter Statistically Significant
X2	0.3044	0.05	Parameter Statistically Insignificant
X3	0.0439	0.05	Parameter Statistically Significant
X4	0.0579	0.05	Parameter Statistically Significant
X5	0.4191	0.05	Parameter Statistically Insignificant
X6	0.5332	0.05	Parameter Statistically Insignificant
X7	0.0699	0.05	Parameter Statistically Significant
X8	0.6189	0.05	Parameter Statistically Insignificant
X9	0.0368	0.05	Parameter Statistically Significant
X10	0.0369	0.05	Parameter Statistically Significant

Source: Own work, calculated based on GRETL and Equation 3

Based on the above table results, which were calculated based on GRETL and parameters estimation, it can be stated that 6 variables out of 10 in this model have a significant impact on changes of the unemployment rate in KZ. Based on these results, the original assumptions can now be referred to and compared with the results of the analysis.

The initial hypothesis were as follows:

- H0. There are no statistically significant factors within this model.
- H1. Changes of unemployment rate in Kazakhstan are mainly explained by the 9 independent variables which were considered in the model.
- H2. Development of inflation rates for consumer goods and income from tourism are the most important factors influencing changes on unemployment rate.
- H3. Increase on Foreign Direct Investment (FDI) within Kazakhstan will have a positive effect on decrease of unemployment.

H4. Corruption perception index is playing an important role on the unemployment rate. So, increase of corruption perception should lead to an increase of unemployment as well.

The results from the econometric estimation based on Gretl output and the comparison with the initial hypothesis are as follows:

1. First hypothesis is partially confirmed. Based on the econometric verification, not all independent variables are important for the unemployment rate in Kazakhstan. Only 6 out of 10 variables have a significant impact on changes.
2. The second hypothesis was declined. Based on the elasticity calculation, the most significant factor are FDI net inflows.
3. The third hypothesis was confirmed. If FDI net inflow will increase for 1 million USD, then the unemployment rate will decrease by 0.004 % per annum. However, it has only a very low impact on the unemployment rate.
4. The fourth hypothesis was fully confirmed. The corruption index is within the list of the most important factors impacting unemployment changes in KZ. An increase in corruption perception would negatively affect unemployment rate and one index improvement will lead to 0.03% decrease on unemployment.

R-squared for this model is equal to 0.976969 or 97.7%. This means that econometric model on changes of unemployment rate in Kazakhstan over the last 20 years is a very good example which can be explained with changes in the dependent variable for 97.7%, while the remaining 2.3 % is with stochastic variables. In other words, the combination of all 10 independent variables which is concerned in this model, they explain the changes on unemployment rate on a rate of 97.7%.

Table 6: White's Test

Mean dependent var	6.466900	S.D. dependent var	1.773468
Sum squared resid	1.412168	S.E. of regression	0.375788
R-squared	0.976369	Adjusted R-squared	0.955101
F(9, 10)	45.90768	P-value(F)	5.87e-07
Log-likelihood	-1.872713	Akaike criterion	23.74543
Schwarz criterion	33.70275	Hannan-Quinn	25.68920
rho	0.103965	Durbin-Watson	1.741477

Excluding the constant, p-value was highest for variable 9 (X8)

White's test for heteroskedasticity -
 Null hypothesis: heteroskedasticity not present
 Test statistic: LM = 18.5697
 with p-value = P(Chi-square(18) > 18.5697) = 0.418756

Source: GRETL

Table 7: Hypotheses on Heteroscedasticity and Homoscedasticity

<i>Ho: Hypothesis</i>	Homoscedasticity
<i>H1: Hypothesis</i>	Heteroscedasticity

Source : Own work

Within the next part of the analysis, it is necessary to check whether there is Heteroscedasticity in the model, therefore for testing Normality and Heteroscedasticity White’s test will be used. White Test Results show that there is no heteroscedasticity in the model. The assumption of homoscedasticity (meaning “same variance”) is central to linear regression models. Homoscedasticity describes a situation in which the error term (that is, the “noise” or random disturbance in the relationship between the independent variables and the dependent variable) is the same across all values of the independent variables. Heteroscedasticity (the violation of homoscedasticity) is present when the size of the error term differs across values of an independent variable. The impact of violating the assumption of homoscedasticity is a matter of degree, increasing as heteroscedasticity increases.

Table 8: Result of White's Test

	P-value	Alpha	Result
White test (Heteroscedasticity)	0.418756	0.05	Ho approved - Homoscedasticity

Source: Own work after the table 6

4.2.4 Elasticity

In this chapter of the analysis the coefficient of elasticity calculation will be calculated which allows for scenario simulation. The elasticity calculation for the whole periods can be found in the appendix and calculation was done based on the following equation:

Formula 3: Elasticity

$$\frac{\partial Y_{1t}}{\partial X_{1t}} * \frac{X_{1t}}{\hat{Y}}$$

Equation 4: Elasticity calculation for scenarios simulation

Y1 Theoretical formula for 2020 = 6.79319 – 0.004 X2t - 0.09 X3t + 0.22 X4t - 0.43 X5t + 0.025 X6t + 8.63 X7t - 0.03 X8t -0.0006 X9t – 0.19 X10t + Ut

Y1 Theoretical results for 2020 = -26.793

Table 9: Results of Elasticity calculations based on Equation 4

Years	Y Theoretical	Elasticity for X2	Elasticity for X3	Elasticity for X4	Elasticity for X5
2020	-26.793	1.106	0.014	0.021	0.024

Years	Elasticity for X6	Elasticity for X7	Elasticity for X8	Elasticity for X9	Elasticity for X10
2020	-0.005	-0.037	0.069	0.013	0.048

Source: Own work

The interpretations of the results are as follows:

2. If foreign direct investment will increase by 1 %, then unemployment rate will decrease by 1.106% per annum in Kazakhstan.
3. If inflation will increase by 1 %, then unemployment rate will decrease by 0.014 % per annum in Kazakhstan.
4. If GDP growth will increase by 1 %, then unemployment rate will increase by 0.021% per annum in Kazakhstan.

5. If urban population growth will increase by 1 %, then unemployment rate will decrease by 0.024 % per annum in Kazakhstan.
6. If time required to start business will increase by 1 %, then unemployment rate will increase by 0.005 % per annum in Kazakhstan.
7. If research and development expenditure perception will increase by 1 %, then unemployment rate will increase by 0.037 % per annum in Kazakhstan.
8. If corruption perception index will increase by 1 %, then unemployment rate will increase by 0.069 % per annum in Kazakhstan.
9. If income from tourism will decrease by 1 %, then unemployment rate will increase by 0.013 % per annum in Kazakhstan.
10. If inflation rates for consumer goods will increase by 1 %, then unemployment rate will decrease by 0.048 % per annum in Kazakhstan.

Based on the outputs from the elasticity calculation it can be summarized that foreign direct investment in net flows has the biggest impact on unemployment rate in Kazakhstan. The least impact from the variables list is Time required to start a business.

5 Results and discussion

The growth of GDP as well as the GDP per capita show that the Kazakh economy undergoes a positive development and is very similar to the one of the Russian Federation. While there are still differences in terms of growth, the twenty-year developments in GDP per capita are almost identical and clearly outperform the other CIS states examined. Russia's economic lead in this context was to be expected, but the trend indicates that the Kazakh economy is more prosperous and that higher standards of living exist here than in the other CIS countries. The distribution of employment along the three sectors can also be seen as an indication of this. Here, the Russian Federation has significantly fewer employees in the agricultural sector, but significantly more in the industrial sector and somewhat more in the service sector. Kazakhstan, on the other hand, has a higher number of employees in the agricultural sector, but this is at the lowest level among all CIS states in 2019, and the decline in the number of employees in this sector is also the second highest after Kyrgyzstan, ahead of Russia. The industrial sector differs to a certain extent. Although the number of employees in the observed twenty-year period is increasing consistently, this is the lowest of all CIS countries in Kazakhstan in 2019. At the same time, employment in this sector exceeds that in the agricultural sector by 6%. Employment in the service sector is also almost on a par with Russia and it even takes a steeper development. In accordance with Fourastié's three-sector hypothesis, this development generally indicates a positive trend toward a service society, which increases the life chances of individuals and reduces the number of unemployed. Therefore, it can be stated that all of these developments indicate that Kazakhstan is making substantial progress toward an economy which is comparable to that of developed countries.

In principle, this is also accompanied by Kazakhstan's unemployment figures, which, after a continuous reduction, have stabilized at about 5 % in 2020 and therefore at the lowest level of all CIS states. Even the corona pandemic does not seem to make a difference in the development of unemployment rates, although it does cause a significant increase of the rates in the other CIS countries. To identify the factors that influenced this development in unemployment in Kazakhstan an econometric model was applied. As a basis for the application of the model, four hypotheses have been made. Out of the four, three have been confirmed. For the first assumption, it could be confirmed that changes on the percentage of

total labour force in Kazakhstan's unemployment rate depend on the defined independent variables based on the R-squared resulting in 0.976969 or 97.7%. This means that the development of unemployment rate in Kazakhstan over last 20 years can be very well explained with changes in the dependent variable for 97.7%, while the remaining 2.3% are with stochastic variables. Therefore, the combination of all 10 independent variables, which have concerned in this model for 97.7%, can explain the changes on unemployment rate. The only assumption that has been declined based on the estimation results was the second one which suggested that the development of inflation rates for consumer goods and income from tourism are the most important factors influencing unemployment in Kazakhstan in the observed 20 years. Instead, based on elasticity calculation, foreign direct investments and corruption perception index have the greatest impact out of the defined variables on Kazakhstan's unemployment rate, confirming both the hypotheses 3 and 4. This means that while an increase in foreign direct investments leads to a reduction of unemployment rates, an increase of corruption perception index also increases the unemployment rate.

After presenting the results, some points remain that are worth discussing. In the following, these points are elaborated by bringing together and discussing the findings of the two parts of the practical chapter. Three main topics were identified, which will be addressed one by one in order to be able to make recommendations for the future development of Kazakhstan for each of these topics.

Insufficient coverage of unemployment:

Especially in view of the fact that Kazakhstan is one of the 20 largest oil and gas exporters in the world, the small difference between the agricultural and industrial sectors is surprising. While technological progress and a high number of foreign specialists are reasons why the numbers in the industrial sector are so low compared to other countries, the figure in the agricultural sector appears too high despite an ongoing reduction. Especially when employment, which is still around 15% in 2019, is compared to the GDP generated in the sector, which is only around 5.8% of total GDP in 2020 (UN Data, 2022), a severe discrepancy is evident. This shows that the agricultural sector still employs a disproportionately large number of people despite an overall downward trend. In addition to that, about two-thirds of those employed in the agricultural sector are self-employed (WorldBank, 2016). This fits into the picture that was already addressed in Chapter 4.1.4:

the inadequate recording of employment figures. Although Kazakhstan has the most stable reduction in unemployment figures, this number does not reflect the real development, as a large proportion of non-working Kazakhs are classified as "inactive" self-employed and are thus officially still considered employed. A large proportion of these self-employed can be attributed to the agricultural sector, which has an employment rate well above its share of total GDP.

Ultimately, these points emphasize the need for a revision of unemployment coverage to provide specific statements about it and all related issues. While this may temporarily increase unemployment, in the long run it would allow for benefits to economic development and consideration of appropriate measures to address unemployment. The results of the econometric model, which show a direct correlation between the corruption perception index and unemployment, also support this argument. This is because recording the actual situation, not only in the area of unemployment, can contribute to increased public confidence in their government. In this way, the government can not only take more targeted measures to combat unemployment, but also have a direct positive influence on reducing it.

Many jobs, low productivity:

The next crucial aspect is that although Kazakhstan as a whole does not have a problem with too few available jobs, the productivity of the professions practiced is comparatively low. As highlighted by Strokova et al., a large part of the unproductive labour force is in the agricultural sector (Strokova et al., 2016). Often, they are subsistence farmers who confront substantial challenges in increasing their output. The dependence of the Kazakh economy on oil and gas exports can be taken as an indication of low productivity. As one of the world's largest exporters, Kazakhstan is highly dependent on this sector. This is particularly evident from the development of GDP per capita and the comparison of GDP growth with other countries. In 2014, when global oil prices fell rapidly as a result of the annexation of Crimea, Kazakhstan's GDP growth also shrank to the low level of 1%, which only Russia has fallen below. GDP per capita also dropped during this period, which contrasts with other countries' GDP per capita trends. In contrast, GDP growth in the other CIS states remained high during this period, despite minimal declines. The fact that the deterioration in economic productivity has not been accompanied by a significant decline in employment confirms the assumption made earlier that a disproportionately high share of

unproductive labour is still employed in the agricultural sector, which has not been affected by lower oil prices. At the same time, the highly productive industrial sector shows only little growth, also throughout the times of crisis. It shows that it had no real impact on employees in the industrial sector, as production remains elementary to Kazakhstan's economic sustainability.

Overall, the slow growth in the industrial sector shows that the highly productive labour force remains at a low level and that, in contrast, there is too high a share of unproductive labour. To counteract this trend, investments and restructuring should be carried out for example in education. Although independence was achieved in 1991, the education system is still characterized by Soviet legacies and central planning. An overwhelming proportion of the working population has only a primary education, resulting in a shortage of skilled workers, especially in the areas of computer science, engineering and technology in general. In this context, teachers' salaries could also be increased to strengthen the attractiveness of this profession as they earn only half of the average salary in Kazakhstan and thus second lowest after the agricultural sector (Santoro and Metzger, 2018).

At the same time, education must also take into account the changing distribution of workers in the respective sectors and, where appropriate, allow for retraining opportunities for people from the agricultural sector. In addition to the areas already mentioned, the service sector, which already accounts for a large share of employment, should also be considered. However, the focus should not be exclusively on the tourism sector. It was shown that this sector has only an insignificant influence on unemployment in the country, which in turn does not mean that it can contribute significantly to the generation of GDP.

Reliance on oil and gas exports:

The crisis caused by low oil prices in 2014 was overcome, which was mainly related to foreign direct investment in the sector to further expand production and thus generate more GDP. Russia in particular, but also China, are the main buyers of Kazakh oil and gas (Santoro and Metzger, 2018). Although Kazakhstan has been able to achieve positive economic development in recent decades largely as a result of its oil and gas exports, it remains vulnerable to external shocks. The general trend toward renewable energy can also pose problems for the market and thus ultimately have a negative impact on Kazakhstan's

unemployment, especially in the industrial sector. For this reason, dependence on the industrial sector should be reduced in the future and the market needs to be diversified. The service sector, which already has high employment figures, represents an opportunity here. In addition, the possibility of focusing on renewable energies should be considered.

Enabling environment for FDI:

Market diversification should also be carried out against the backdrop of attracting foreign direct investment, which, along with the corruption perception index, has the greatest impact on unemployment among the previously defined variables. “As countries develop and approach industrialised-nation status, inward FDI contributes to their further integration into the global economy by engendering and boosting foreign trade flows“ (OECD, 2002). This could be applied to Kazakhstan as well, where the employment distribution among the three sectors as well as minimum wage and unemployment rates tend to show the direction. Although foreign direct investment should not be seen as a cure-all for a weakening economy, it can bring many benefits. In addition to reducing unemployment and potentially increasing imports and exports by connecting to global markets, they can, for example, help improve technological standards by allowing multinational enterprises to provide technical assistance or information to improve their respective products. Furthermore, human capital can also be improved if locals work for foreign companies and are trained there, or competition and the development of domestic companies are promoted. To enable these benefits, however, an FDI-enabling environment is needed. Therefore, it is of great importance to implement the previously mentioned points, such as improving the education system, first. In addition, it is important to cultivate good governance, increase efforts to fight corruption, and generally create policies that work toward market openness to enable domestic companies to participate in the global market (OECD, 2002).

These conditions show that Kazakhstan still faces great challenges in stabilizing its economy and labour market in real terms. It cannot be assumed that all conditions have already been created to enable participation in the global market. Nevertheless, the trend seems to be going in the right direction, so that Kazakhstan one day, too, can evolve into a prospering developed country with good living standards and opportunities for its citizens.

6 Conclusion

The focus of the thesis was on the labour market of Kazakhstan, especially its unemployment. Since its independence from the Soviet Union in 1991, the Eurasian country has faced the challenge of transforming its economy from central planning to a market economy. With an area of about 2.7 million square kilometres, it is the largest landlocked country in the world. Yet its population of about 19 million and its population density of 7 per square kilometre are comparatively low. Against the background of thirty years of independence, the development of Kazakh unemployment was of particular interest. To this end, the objective of the thesis was to characterize the development of unemployment in Kazakhstan. For this purpose, the comparison with other CIS countries was observed, as well as the factors identified that have contributed significantly to the unemployment in Kazakhstan. The following hypotheses upon the factors were developed for this purpose:

- H0. There are no statistically significant factors within this model.
- H1. Changes of unemployment rate in Kazakhstan are mainly explained by the 9 independent variables which were considered in the model.
- H2. Development of inflation rates for consumer goods and income from tourism are the most important factors influencing changes on unemployment rate.
- H3. Increase on Foreign Direct Investment (FDI) within Kazakhstan has a positive effect on decrease of unemployment.
- H4. Corruption perception index is playing an important role on the unemployment rate. So, increase of corruption perception should lead to an increase of unemployment as well.

The first part of the paper describes the theoretical foundations, which were identified through a literature review. In addition to the general classification of the topic of unemployment, the consequences of this, both the economic and the social, are also named. The specifics of the labour market are also described in the theory chapter, before a classification in the circumstances of Kazakhstan and the other CIS countries takes place. The second part of the paper deals with the practical realization of the topic and is divided in two sections. The first section puts Kazakhstan's development into context by comparing it with its neighbouring former Soviet states that belong to the Commonwealth of

Independent States. The second part, through the implementation of an econometric model, addresses the factors that have significantly influenced the evolution of unemployment in recent years and identifies the factors that have the greatest impact.

In principle, Kazakhstan seems to be developing positively. In terms of both GDP growth and GDP per capita, Kazakhstan is showing an upward trend. Growth is mostly stable, which is why GDP per capita is rising over the observed period. The distribution of employment across the three sectors also indicates that Kazakhstan is becoming an industrialized country, as a decline in employment in the agricultural sector and an increase in the service sector can be seen. The only noticeable difference is that the share of employees in the industrial sector exceeds the share of employees in the agricultural sector by only a few percent. This is surprising since Kazakhstan is one of the world's largest exporters of oil and gas, which can be assigned to the industrial sector. Moreover, the high figures in the agricultural sector can be explained by a high number of "inactive" self-employed persons. These are also a reason for the extraordinarily positive development of unemployment. Here, Kazakhstan has the most stable development of all CIS countries and, at 5 %, continues to have a low figure that has not risen as a result of the corona pandemic.

In the second part of the practical part, the econometric model is applied to test the hypotheses made for this purpose. As variables that significantly influence the development of unemployment, 9 variables are chosen, which include, for example, GDP growth, foreign direct investment or the corruption perception index. The results confirm by 97.7% that the combination of all variables determined the development of unemployment in Kazakhstan. The largest contribution of the chosen variables comes from the foreign direct investments as well as a decrease in the corruption perception index.

On this basis, it is recommended that, in general, efforts should be made to maintain GDP growth and to increase it as much as possible. This should be attempted, for example, by diversifying the economy, since it is still substantially dependent on oil and gas exports. In this context, it makes sense to facilitate suitable conditions for participation in the global market, thus enabling foreign direct investments. A greater focus on these makes sense because of two aspects. First, they have the greatest direct impact on the decline in unemployment among the selected variables. In addition, they also contribute to indirect

improvements by enhancing technological conditions and human capital, thus tackling the shortcomings of the Kazakh economy. Secondly, the condition for attracting more foreign direct investment is the creation of an appropriate (regulatory) framework and related policies. This also includes efforts to combat corruption, which can influence the corruption perception index and have a positive effect on unemployment trends. These and other measures should ultimately lead to continued stable development of the Kazakh labour market and contribute to a prosperous economy that is not easily weakened by external shocks.

7 References

Literature sources:

- Amangeldy S., et al. (2016) Legal Regulation of Employment in Kazakhstan, *International journal of environmental & science education*, vol. 11, no. 18.
- Bazglin A. (1994) *Transition Economy. Course of lectures on political economy* Moscow: Taurus.
- Barsky, R. B. and Miron, J. A. (1989) “The seasonal cycle and the business cycle,” *The journal of political economy*, 97(3), pp. 503–534. doi: 10.1086/261614
- Bosenko, O. (2019) *Problema zanyatosti i bezrobotizy v usloviyah rynochnoi ekonomiki*. Kuban state university: Kuban
- Brown, P. (1995) “Cultural capital and social exclusion: Some observations on recent trends in education, employment and the labour market,” *Work, employment & society: a journal of the British Sociological Association*, 9(1), pp. 29–51.
- Falkinger, J. and Grossmann, V. (2002) “Workplaces in the primary economy and wage pressure in the secondary labor market,” *SSRN Electronic Journal*.
- Fourastié, J. (1949) *Le Grand Espoir du XXe siècle. Progrès technique, progrès économique, progrès social*. Presses Universitaires de France, Paris.
- Gandini, A. (2019) “Labour process theory and the gig economy,” *Human relations; studies towards the integration of the social sciences*, 72(6), pp. 1039–1056.
- Goodwin, N. et al. (2019) “Employment, unemployment, and wages,” in *Principles of Economics in Context*. 2nd edition. | New York, NY : Routledge, 2019.: Routledge, pp. 505–527.
- Gasanov Sh.A., Aliev B.H., Sulejmanov M.M. (2011) *Bjudzhety territorij v usloviyah krizisa*. *Finances and credit*. vol 6 (438). P 10-14.
- Hall, R. E. (1979) “A theory of the natural unemployment rate and the duration of employment,” *Journal of monetary economics*, 5(2), pp. 153–169
- Hart K. (1973) *Informal Income Opportunities and Urban Employment in Ghana*. The *Journal of Modern African Studies*. Cambridge University Press
- Kaufman, N. (2017) *Tendencii skrytoi bezroboticy kak osnovnoy faktor kon'yunktury rynka truda*. Surgut State University.
- Khaydarov, N. (2015) *Agricultural Development in Uzbekistan: Agricultural Reforms versus Transboundary Water Issues*. In: *Developing Country Studies*, Vol. 5, Issue no. 10.

- Lazear, E. P. and Oyer, P. (2004) “Internal and external labor markets: a personnel economics approach,” *Labour economics*, 11(5), pp. 527–554.
- Lindbeck, A. (2015) “Unemployment: Structural,” in *International Encyclopedia of the Social & Behavioral Sciences*. Elsevier, pp. 738–743.
- Malmberg-Heimonen, I. and Julkunen, I. (2002) “Equal opportunities, true options or hidden unemployment? A comparative perspective on labour-market marginality,” *International journal of social welfare*, 11(2), pp. 120–131.
- Mankiw (2006) *Macroeconomics*. 6th ed. New York, NY: Worth.
- Nizova L., (2017) *Tehnologiya poiska raboty I sposoby trudoustroistva: kurs lekci*, Yoshkar-Ola: Volga State Technological University, 123p, ISBN: 978-5-8158-1847-7
- Organization for Economic Co-operation and Development [OECD] (2002) *Foreign Direct Investment for Development. Maximising Benefits, Minimising Costs*.
- Pasinetti, L. L. (1990) “Structural change and unemployment,” *Structural change and economic dynamics*, 1(1), pp. 7–13.
- Pigina, T. (2015) “Bezrobotica kak pokazatel’ social’no-ekonomicheskogo razvitiya regiona,” *Russian Entrepreneur*, 16(6), pp. 843–852.
- Plokhy, S. (2015) *The last empire: The final days of the soviet union*. London, England: Basic Books.
- Raizberg, B.A. (2022) *Sovremeni ekonomicheski slovar’*. 6th edn. Moscow: INFRA-M. ISBN 978-5-16-009966-8.
- Rose, D. (2019) “The impact of active labour market policies on the well-being of the unemployed,” *Journal of European social policy*, 29(3), pp. 396–410.
- Santoro, J. and Metzger, C. (2018) *Kazakhstan’s Future Workforce Trends: Challenges and Drivers*. Washington D.C.: Center for Strategic and International Studies.
- Shevchenko I. (2017) *Mirivaya ekonomika i mezhdunarodnye ekonomicheskie otnosheniya*. Krasnodar: Kuban State University
- Shimer, R. (2005) “The cyclical behavior of equilibrium unemployment and vacancies,” *American Economic Review*, 95(1), pp. 25–49.
- Strokova, V., Elzir, A. and Margolis, D. (2016) *Labor Market Outcomes Kazakhstan: Achievements and Remaining Challenges*. Washington D.C.: World Bank.
- Tetsuo O. (2014) *growth, unemployment, and fiscal policy: a political economy analysis*, Osaka University, Graduate School of Economics.

- Welfens, P. J. J. (2012) Globalization of the economy, unemployment and innovation: Structural change, schumpetrian adjustment, and new policy challenges. 1999th ed. Berlin, Germany: Springer.
- White, R. C. (1941) “The seasonal worker and unemployment compensation benefits,” *Social forces; a scientific medium of social study and interpretation*, 19(3), pp. 416–425.
- WorldBank (2016) “Kazakhstan: A Long Road to Recovery,” World Bank Group, Kazakhstan Economic Update, no. 3.
- Zhukov, A. (2018) *Regulirovanie zarobotnoi platy*. Moscow: Direkt-Media. ISBN: 978-5-4475-4725-7

Internet sources:

- CIS (2022) Explore all countries-Turkmenistan [Online]. Available at: <https://www.cia.gov/the-world-factbook/countries/turkmenistan/> (Accessed: 23.03.2022).
- Dzushupov K. et al. (2021) COVID-19 in Kyrgyzstan: Navigating a way out [Online]. Available at: <https://jogh.org/wp-content/uploads/2021/07/jogh-11-03020.pdf> (Accessed 21.03.2022)
- Esanov A., (n.d.) Economic Diversification: The Case for Kazakhstan [Online]. Available at: https://resourcegovernance.org/sites/default/files/RWI_Econ_Diversification_Kazakhstan.pdf (Accessed 11.03.2022)
- Fraye Y., (2008) Unemployment in Kazakhstan. Current stage [Online]. Available at: <https://works.doklad.ru/download/7hID9E3C7uQ.zip> (Accessed: 08.03.2022)
- Gloveli G., (n.d) Klassicheskaya politicheskaya ekonomiya [Online]. Available at: <https://bigenc.ru/economics/text/2071758> (Accessed: 02.03.2022)
- International Labour Office (2014) “Minimum wage systems”, in International Labour Conference 103rd Session. Geneva, p. 33. Available at: https://www.ilo.org/wcmsp5/groups/public/---ed_norm/---relconf/documents/meetingdocument/wcms_235287.pdf (Accessed 26.03.2022).
- International Labour Organization [ILO] (2008) Kyrgyzstan: Economic Growth, Employment and Poverty Reduction [Online]. Available at: https://www.ilo.org/wcmsp5/groups/public/---europe/---ro-geneva/---sro-moscow/documents/publication/wcms_306632.pdf (Accessed 19.03.2022)
- International Labour Organization [ILO] (2009) Russia’s ILO unemployment rate down 100,000 people in August [Online]. Available at:

https://www.ilo.org/moscow/news/WCMS_429693/lang--en/index.htm (Accessed 21.03.2022)

International Labour Organization [ILO] (2021) Which country has the highest minimum wage?, Statistics on wages. Available at: <https://ilostat.ilo.org/topics/wages/> (Accessed: 26.03. 2022).

IMF (2014) Respublica Kazakhstan dokumenty po otdel'nym voprosom. [online]. Available at: <http://www.imf.org/imported-publications/external/russian/pubs/scr> (Accessed:10.03.2022)

Jahan S., Mahmud A. and Papageorgiou C. (2014) What Is Keynesian Economics? [Online]. Available at: <https://www.imf.org/external/pubs/ft/fandd/2014/09/basics.htm> (Accessed: 02.03.2022)

Owyang M., Vermann K. and Sekhposyan T. (2013) Output and Unemployment: How Do They Relate Today? [Online]. Available at: <https://www.stlouisfed.org/publications/regional-economist/october-2013/output-and-unemployment-how-do-they-relate-today> (Accessed: 13.03.2022)

Pettinger T. (2016) Transition from a Command Economy to a Market Economy [Online]. Available at: <https://www.economicshelp.org/europe/transition-market-economy/> (Accessed: 11.03.2022)

Radio Azattyq (2019) Unemployment in Kazakhstan. Statistics and opinions [Online]. Available at: <https://rus.azattyq.org/a/kazakhstan-unemployment-statistics-and-opinion/30150578.html> (Accessed: 01.03.2022)

Sonnichsen N. (2021) Global natural gas reserves by country 2010-2020 [Online]. Available at: <https://www.statista.com/statistics/265329/countries-with-the-largest-natural-gas-reserves/> (Accessed: 11.03.2022).

United Nations Data [UN Data] (2022) Gross Value Added by Kind of Economic Activity at current prices – National currency, UN Data. Available at: <http://data.un.org/Data.aspx?d=SNAAMA&f=grID%3A201%3BcurrID%3ANCU%3BpcFlag%3A0> (Accessed: 15.03. 2022).

UNESCO (n.d.) R&D spending by country [Online]. Available at: <http://uis.unesco.org/apps/visualisations/research-and-development-spending/> (Accessed: 17.03.2022)

WorldBank (2020) The World Bank in the Kyrgyz Republic [Online]. Available at: <https://www.worldbank.org/en/country/kyrgyzrepublic/overview#1> (Accessed: 14.03.2022)

WorldBank (2022a) GDP Growth (annual %) [Online]. Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG> (Accessed: 14.03.2022)

- WorldBank (2022b) GDP per capita, PPP [Online]. Available at:
<https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?locations=RU>
(Accessed: 14.03.2022)
- WorldBank (2022c) Employment in agricultural sector [Online]. Available at:
<https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS?locations=RU> (Accessed:
11.03.2022)
- WorldBank (2022d) Employment in Industry [Online]. Available at:
<https://data.worldbank.org/indicator/SL.IND.EMPL.ZS?locations=RU> (Accessed:
13.03.2022)
- WorldBank (2022e) Employment in Service sector [Online]. Available at:
<https://data.worldbank.org/indicator/SL.SRV.EMPL.ZS?locations=RU> (Accessed:
14.03.2022)
- WorldBank (2022f) Unemployment, total (% of total labor force) (national estimate)
[Online] Available at: <https://data.worldbank.org/indicator/SL.UEM.TOTL.NE.ZS>
(Accessed: 14.03.2022)
- WorldBank (2022g) Foreign direct investment, net inflows (BoP, current US\$) [Online].
Available at: <https://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD>
(Accessed: 16.03.2022)
- WorldData (2022) Kazakhstan [Online]. Available at:
<https://www.worlddata.info/asia/kazakhstan/index.php> (Accessed: 14.03.2022)
- Worldometers (2022) Countries in the world by population [Online]. Available at:
<https://www.worldometers.info/world-population/population-by-country/>
(Accessed: 14.03.2022).

8 Appendix

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Appendix A: Elasticity Calculation

$$Y1 = 6.79319 - 0.004 X2t - 0.09 X3t + 0.22 X4t - 0.43 X5t + 0.025 X6t + 8.63 X7t - 0.03 X8t - 0.0006 X9t - 0.19 X10t + Ut$$

Y1t ... Unemployment, total (% of total labour force) (modeled ILO estimate)

X2t ... Foreign direct investment, net inflows (BoP, current US\$, in millions)

X3t ... Inflation, GDP deflator (annual %)

X4t ... GDP growth (annual %)

X5t ... Urban population growth (annual %)

X6t ... Time required to start a business (days)

X7t ... Research and development expenditure (% of GDP)

X8t ... Corruption Perceptions index (0 - low, 100 - high)

X9t ... Income from Tourism (in mil USD)

X10t ... Development of inflation rates for consumer goods

U1t ... Random error, $\sim \text{nid}(0, \sigma^2)$

Appendix B: Elasticity Calculation from 2001-2002 and Y1-X5 based on Equation 4

Years	Y Theoretical	Elasticity for X2	Elasticity for X3	Elasticity for X4	Elasticity for X5
Formula	6.78319- 0.004*X2- 0.09*X3+0.22* X4- 0.43*X5+0.025 *X6+8.63*X7- 0.03*X8- 0.0006*X9- 0.19*X10	-0.004*X2/Y Theoretical	-0.09*X3/Y Theoretical	0.22*X4/ Y Theoretic al	- 0.43*X5/ Y Theoretic al
2001	-3.982	2.830	0.230	-0.746	-0.004
2002	-2.875	3.601	0.182	-0.750	0.020
2003	-3.267	3.040	0.323	-0.626	0.061
2004	-16.558	1.357	0.088	-0.128	0.021
2005	-4.232	2.407	0.380	-0.504	0.103
2006	-25.445	1.196	0.076	-0.093	0.020
2007	-43.768	1.094	0.032	-0.045	0.013
2008	-66.326	1.014	0.028	-0.011	0.013
2009	-53.052	1.076	0.008	-0.005	0.017
2010	-26.186	1.139	0.067	-0.061	0.025
2011	-51.900	1.061	0.036	-0.031	0.013
2012	-50.212	1.087	0.009	-0.021	0.013
2013	-36.296	1.103	0.024	-0.036	0.019
2014	-25.639	1.140	0.020	-0.036	0.027
2015	-22.900	1.149	0.007	-0.012	0.030
2016	-68.375	1.007	0.018	-0.004	0.010
2017	-16.284	1.158	0.062	-0.055	0.039
2018	2.347	-0.142	-0.353	0.384	-0.270
2019	-11.961	1.244	0.057	-0.083	0.053
2020	-26.793	1.106	0.014	0.021	0.024

Appendix C: Elasticity Calculation from 2001-2002 and X6-X10 based on Equation 4

Years	Elasticity for X6	Elasticity for X7	Elasticity for X8	Elasticity for X9	Elasticity for X10
Formula	$0.025 \cdot X6/Y$ Theoretical	$8.63 \cdot X7/Y$ Theoretical	$-0.03 \cdot X8/Y$ Theoretical	$-0.0006 \cdot X9/Y$ Theoretical	$-0.19 \cdot X10/Y$ Theoretical
2001	-0.201	-0.477	0.598	0.076	0.398
2002	-0.278	-0.765	0.822	0.142	0.386
2003	-0.245	-0.667	0.698	0.117	0.374
2004	-0.048	-0.129	0.141	0.029	0.079
2005	-0.183	-0.578	0.525	0.114	0.340
2006	-0.027	-0.082	0.087	0.023	0.065
2007	-0.015	-0.041	0.054	0.017	0.047
2008	-0.010	-0.028	0.035	0.011	0.049
2009	-0.012	-0.037	0.041	0.013	0.026
2010	-0.024	-0.051	0.081	0.028	0.054
2011	-0.012	-0.026	0.042	0.018	0.031
2012	-0.012	-0.028	0.043	0.026	0.019
2013	-0.012	-0.041	0.061	0.039	0.031
2014	-0.016	-0.056	0.083	0.052	0.050
2015	-0.012	-0.064	0.094	0.048	0.055
2016	-0.003	-0.019	0.031	0.018	0.040
2017	-0.014	-0.074	0.127	0.087	0.087
2018	0.053	0.484	-0.882	-0.677	-0.487
2019	-0.010	-0.089	0.166	0.146	0.083
2020	-0.005	-0.037	0.069	0.013	0.048